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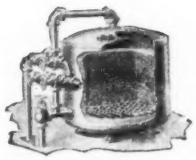

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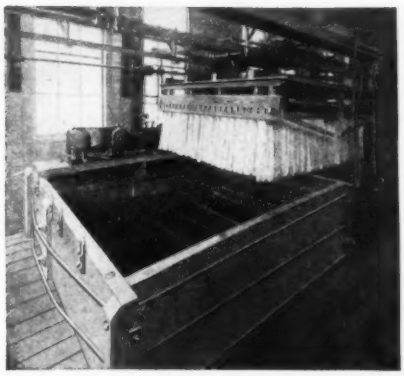

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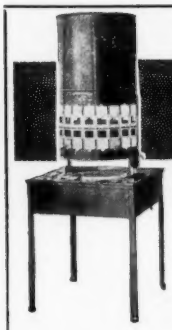

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VOLUME XIV NEW YORK, APRIL 20, 1925 NUMBER 6

Dyeing Acetate Silk

Part III

Dyeing Acetate Silk with Basic Dyes—Additions of Celloxane—Basic and Gallocyanine Dyes on Celanese —Basic Dyes on Lustron—Use of Ammonium Salts—Basic Dyes on Acetate Silk

By CHAS. E. MULLIN, M. Sc., F. A. I. C.

(All rights reserved by author.)

EARLY in the development of acetate silk it was well known that it absorbed a few dyes substantively, but these were mainly basics. Some of these basic dyes possess an excellent fastness on acetate silk, entirely out of relation to their fastness on other fibers. The di and tri phenylmethane dyes have a good affinity for acetate silk, the former being the most useful; as, for instance, Malachite Green, Magenta and Chrome Violet. Increased methylation of the di or tri phenylmethane dye appears to decrease its fastness on acetate silk. Thiazine dyes such as Methylene Blue are not so very satisfactory, but oxazine dyes, which contain an atom of oxygen in place of the sulphur atom present in the thiazine dyes, are useful. Suitable oxazine dyes are Nile Blue, Capri Blue and New Methylene Blue. Another point which should be kept in mind is that Lustron dyes with some basic dyes which leave Celanese white, and Mr. Little states that it is possible to dye the Lustron in a Lustron-Celanese union while leaving the Celanese white.

The use of metallic salts in the dye bath has been mentioned in a previous instalment of this article, but will now be considered more in detail. Clavel, in British Patent No. 176,535 (December 14, 1920), covers the use of chlorides in applying basic, acid and direct dyes to acetate silk. He states that the dye bath may contain one or more chlorides and an acid, with or without a protective colloid. Suitable chlorides are given as those of ammonium, potassium, sodium, barium, magnesium, zinc or tin (ous); formic or acetic are suitable acids, and the protective colloid may be gelatine, albumin, silk boil-off liquor, tannates, soaps, sulphonated fatty acids, etc. The dyeing is preferably effected in a foam bath as described in British Patents Nos. 102,310 and 103,638 (Chemical Abstracts 11, 709 and 1754), which cover real silk dyeing. British Patents Nos. 187,964, 199,754 and 204,179 also cover processes along this line. In a later British patent, No. 182,830 (1922), Clavel states that magnesium chloride and stannous chloride in the dye bath increase the affinity of acetate silk for basic dyes. (See Method No. 17.)

Celloxane is a viscous liquid for use in dyeing acetate silk, and contains a large proportion of zinc nitrate. Its main use is as an assistant for basic dyes, and it is claimed to produce decidedly deeper shades than are obtainable otherwise. The Celloxane is usually added to the warm dye bath immediately before dyeing. Table II shows the dyes suitable for use with Celloxane and the amount in cubic centimeters to be added to each liter of dye bath for a 2 per cent dyeing. The mark * denotes that the shade is particularly fast to light.

TABLE II

Cubic Centimeters of Celloxane per Liter of Dye Liquor for a Two Per Cent Dyeing

Auracine G	10
*Auramine O	20
Auramine G	20
Corephosphine O	15
Corephosphine OX	15
*Rhoduline Yellow T	15
*Rhoduline Yellow 6G	15
Chrysordine G Extra	15
Shrysordine R Extra	15
Rhoduline Orange N	15
Rhoduline Orange NO	15

*Rhodamine 3B	15
*Rhodamine 6G Extra	6
Rhoduline Red B	15
Rhoduline Red G	5 to 75
*New Magenta	10 to 15
*Diamond Fuchsine	10 to 15
Safranine FF Extra	10
Bismarck Brown FR Extra	20
*Brilliant Rhoduline Purple R	4 to 5
*Crystal Violet P	10
*Methyl Violet 1B, 2B and 4B	4
*Methyl Violet 5B and 6B	5
*Methyl Violet 1R and 4R	4
*Rhoduline Heliotrope B and 3B	10
Methylene Blue BB and RR	15
New Methylene Blue F	15
*Rhoduline Blue 5B	3
*Rhoduline Blue 6G Conc	15
Rhoduline Blue GO and 3GO	15
Rhoduline Sky Blue BB and 3G	15
*Turquoise Blue BB and G	15
Brilliant Rhoduline Blue R	15
Methylene Blue B	15
*Methylene Green B	15
*Brilliant Green Crystals	15
*Chine Green Crystals	15
*Imperial Green GI	15

It should be remembered that it is impossible to mordant acetate silk, and therefore that tannin and other mordants which are generally used with the basic dyes are useless on this fiber. While acetic, formic, tartaric, lactic or mineral acids, sodium chloride, sodium sulphate or sodium acetate in small amounts may be used as retards for basic dyes on acetate silk, usually only acetic acid or sodium chloride is used, as these give best results. In dyeing unions where it is desired to leave the other fibers unstained, acetic acid is generally used. Sulphuric and hydrochloric acids should never be used in acetate silk.

Method No. 14: *Basic and Gallocyanine Dyes on Celanese.*—The British Celanese Company recommend that the basic and gallocyanine dyes be applied to Celanese with acetic or formic acid and sodium chloride, with either hard or soft water. While the exhaustions are not so good by this method, the brilliancy of shade obtained is often very desirable. The fastness of these dyes to acids is, of course, excellent, but their fastness to alkalies and soaping is not as high as with some of the newer dyes developed particularly for acetate silk. Basic dyes are also frequently used for topping other dyes on acetate silk, just as they are used on cotton to secure brighter colors. A 25 or 30 to 1 dye bath is recommended in a copper vessel, except in the case of dyes sensitive to metals, such as Chrome Blue and Prune Pure, where wood must be used unless ammonium sulphocyanide is added to the bath.

After dyeing, the material should be well rinsed as in Method No. 1 and given a light soaping at 45 deg. Cent. (113 deg. Fahr.) where necessary on deep shades to prevent crocking. The following formulas are given as typical for dyeing Celanese:

Saxe.—Capri Blue GON, 0.3 per cent; Magenta Crystals, 0.006 per cent; acetic acid (100 per cent), 1 c.c. per liter; sodium chloride (at start), 30 per cent. Enter at 45 deg. Cent. (113 deg. Fahr.) and dye at 45 to 80 deg. Cent. (113 to 176 deg. Fahr.) for one and one-quarter hours.

Deep Royal.—Prune Pure, 1.5 per cent; acetic acid (100 per cent), 1 c.c. per liter; sodium chloride (at start), 30 per cent. Enter at 45 deg. Cent. (113 deg. Fahr.) and dye at 45 to 80 deg. Cent. (113 to 176 deg. Fahr.) for one and three-quarter hours.

Method No. 15: *Basic Dyes on Lustron.*—As before stated, Lustron has the highest affinity for the basic dyes of any fiber known, and for this reason will pull them away from even Celanese, silk or wool. If Lustron and Celanese are dyed together in the same bath at the same time with a basic dye such as Rhodamine or Malachite Green, the Lustron will take on a very full shade, while the Celanese will be dyed only a comparatively light shade. For this reason Lustron can readily be cross-dyed in unions containing silk, wool, cotton and artificial silk, or in any mixture of these. On account of this high affinity, as long dye baths as convenient should be used; and if no retarding agent is present in the dye bath the Lustron must be entered into the cold dye bath to prevent unevenness. One per cent of most basic dyes will give a deep shade on Lustron. It is best to enter the goods cold even when retards are used, and then gradually bring the temperature up to not over 80 deg. Cent. (176 deg. Fahr.), holding it there until the dyeing is completed. At least 10 per cent of sodium chloride should be added to the dye bath, and acetic acid if required. Lactic and tartaric acids may also be used in dyeing Lustron. The basic dyes on Lustron level better in medium to full shades than in pale shades.

On Lustron the basic dyes show good fastness to soaping and excellent fastness to acids. Some of these dyes also show an excellent fastness to light. The order of fastness is noticeably different from the same dyes on cotton, as shown by the following list, and it appears that some basic dyes are faster on Lustron than on Celanese, as might be expected from their affinities. This possibly accounts for some of the discrepant statements in the literature regarding the fastness of certain basic dyes on acetate silk.

Good Fastness to Light.—Methylene Heliotrope, Turquoise Blue G (for pale to full Sky Blue), Setocyanine, Capri Blue GON, Cresyl Blue 2RS, Victoria Green WB, Methylene Green B, Brilliant Green.

Fair Fastness to Light.—Crystal Violet, Methyl Vio-

let, Fuchsine, Fast Blue RS or Meldola Blue, Thioflavine T, TG or TG Extra, Auramine (in heavy shades), Pyronine G, Acridine Red.

The other common basic dyes show moderate to poor light fastness on acetate silk. The following dyes are applied to acetate silk by Method No. 14 or No. 15, and show a satisfactory fastness for many purposes. They are not all basic dyes:

Magenta (light shades), Malachite Green, Rhodamine S, B, B Extra, G and 6G, Ethyl Purple 6B, Chrome Gray (for all grays and as a dulling medium), Seto Glaucine, Cresyl Violet, Ultra Violet, Chrysoidine, Rubine, Ethyl Green, Bismarck Brown, Methylene Gray B, Methylene Blues, Safranines, Acridines, Tannin Heliotrope, Victoria Blues, Cotton Blue 2B, Auracene G, Rheonine A, Indine Blue 2RD, Induline Scarlet, Night Blues, Nile Blues, Masic Black FCG and SB, Fast Navy Blue R, Alizarine Granat.

While with Method No. 15 the dyes given may be used in combination with each other, it is not advisable to mix more than two colors in the same bath or unevenness may result. It is not necessary to use tannin or any other mardants with the above dyes on acetate silk. Chrome Blue is a chrome developing dye and may be mixed with basics only in small quantities. As it is affected by metals, copper should not be present in dye baths containing it. On account of its high affinity for the fiber, it is best to enter the acetate silk at low temperatures in dye baths containing it.

Method No. 16: Basic Dyes on Acetate Silk with Ammonium Salts.—Another method of applying the basic dyes is in a bath containing ammonium chloride, sulphate or preferably the acetate, but this method does not appear to be mentioned by either the Celanese or Lustron company. A 20 to 1 dye bath is used and the material is entered into a lukewarm dye bath containing some ammonium chloride, sulphate or acetate and the dyestuff. The bath is heated to 60 to 70 deg. Cent. (140 to 158 deg. Fahr.) in about half an hour and held at this temperature for the same length of time, when more of the ammonia salt in solution is added gradually to aid exhaustion, until about 30 to 50 per cent of the salt is present in the dye bath.

The following dyes, not all basic, are recommended for application by Method No. 16:

Green Yellow Shade 32, Vesuvine Conc., Tannocyanine, Rosazeine B Extra and 6G, Janus Yellow R, Auramine O, Methyl Violet, Malachite Green, Chrysoidine, Crystal Violet O, Magenta, Methylene Heliotrop, Brilliant Green Crystals.

When applied by Method No. 16, the above dyes, it is claimed, have good fastness to water and washing and, with the exception of Chrysoidine and Vesuvine, are fast to acid. Janus Yellow, Rosazeine, Magenta, Malachite Green, Brilliant Green and Tannocyanine are particularly fast to light, while the others are stated to be satisfactory in this respect. On the other hand, Safranine, Methylene Violet, Methylene Blue and Thionine Blue are not so fast to light on acetate silk, while Methylene Yellow and Flavophosphine are very fugitive to light. The Victoria Blues dye rather weakly and do not have any particular light fastness. Phosphine also dyes weakly; and really one of the main deficiencies of the basic dyes on acetate silk has been a fast yellow.

Method No. 17: Basic Dyes on Acetate Silk.—Magnesium chloride is used as follows in applying basic dyes to acetate silk: Use a dye bath containing 1 or 2 per cent of acetic acid and 5 to 20 grams of magnesium chloride or sodium chloride per liter. Enter the material cold and heat gradually so that in about one hour a temperature of 85 deg. Cent. (185 deg. Fahr.) is reached. Finish in water containing acetic, formic or tartaric acid. A "scroop" finish may be obtained by adding a little olive oil emulsion to this bath.

(*To be continued*)

THE PONSOL DYESTUFFS

E. I. du Pont de Nemours & Co., Inc., have just issued a circular, entitled "The Ponsol Dyestuffs," describing the properties and wide use of this very remarkable line of vat colors on cotton, and in addition showing dyeings in two strengths on yarn. Directions for dyeing rawstock, yarn and pieces, by various methods are also included. The circular should prove to be of great value to any user of the vat colors of the Anthracene series.

In addition, to those who have been following the development of the dyestuff industry in America, the circular is a resume of the achievements of one company in surmounting the great difficulties that were encountered in the manufacture of a line of colors which is considered the very finest obtainable for cotton.

Although this circular has just been issued, the list of dyes mentioned therein has already been augmented by the addition of a new dye, Ponsol Brilliant Blue R Paste, which has just recently been announced.

NEW FLOSS CARD ISSUED

The Textile Color Card Association of the United States, Inc., has released to its members the Advance Floss Card for the fall and winter of 1925. The card contains 100 colors, a special feature being twenty-two "ensemble wool and silk shades." These form a collection of Oriental rug colors with their appropriate names.

The floss card has received a very enthusiastic reception from the members of the association.

The regular edition will be ready for general distribution to the trade the latter part of May. Supplementary cards showing the six fall shoe and leather colors will be issued to the shoe, leather and hosiery members of the Textile Color Card Association within a couple of weeks.

Soledon Jade Green

[*Considerable interest has recently been shown toward press dispatches describing a new series of dyestuffs developed by Scottish Dyes, Ltd., under the general group title of "Soledon" colors, soluble dyestuffs of the anthraquinone series. The Bureau of Foreign and Domestic Commerce of the United States Department of Commerce communicated with its London office on the subject and obtained from Assistant Trade Commissioner Isaacs the letter and accompanying article published below. This material was supplied to the* REPORTER *by C. C. Concannon, chief of the Chemical Division of the Department of Commerce.*—ED.]

The Director,
Bureau of Foreign & Domestic Commerce,
Department of Commerce, Washington, D. C.

Attention: Mr. C. C. Concannon, Chief, Chemical Division.

Dear Mr. Concannon:

Reference is made to your letter of January 14, quoting a note published in the Daily News Record of January 2nd concerning a new series of dyestuffs being produced by the Scottish Dyes, Ltd., known as anthraquinone vat dyes in soluble form, suitable for dyeing woolens, cottons, linens, silks and viscose silk.

Soledon Jade Green is the only one of the series available at the present time, and the attached report is based on information obtained from the manufacturers' agents and one or two other contacts of this office in the dye trade, and will give you an idea as to the significance of this new dye, its unusual advantages, and also instructions for application.

We shall keep in touch with the producers relative to the production of other shades, and should you desire further information will you kindly let me know?

Very truly yours,
C. GRANT ISAACS,
Assistant Trade Commissioner.

THE REPORT

Soledon Jade Green is the first dyestuff of a new series of dyes now being placed on the market by the Scottish Dyes, Ltd. It is the only one available commercially, but other members are being worked out and may be expected shortly. The new dyestuff is well suited for the production of fast shades on cottons, linens, silks and viscose, or artificial silks, the color being fast to light, washing, milling and other agencies, even in the palest shades. The fastness is such that it is possible to give a complete guarantee to the public with absolute safety.

The "Soledon Jade Green," or the so-called "Soledon" colors are stable soluble salts of the "Caledon," or that is, anthraquinone vat colors. They bear a similar relation to the latter as that existing between the stable salt of leuco-indigo, or Indigosol O, of the Swiss firm of Durand Huguenin & Co., and Indigo. Indigosol O was acclaimed as a signal advance on indigo by reason of its greater ease of handling and of application—so it may be anticipated that the Soledon colors will prove an even more important milestone in the evolution of fast colors and of their application. Ordinary vat dyestuffs already provide the means of obtaining absolutely fast shades on cotton and other vegetable fibers, but they are much less suitable for wool and silk. So, therefore, where the use of Indigosol O simplifies the production of indigo shades on animal and vegetable fibers, the new Soledon Jade Green or Soledon colors have even a greater significance in that they extend an easy application of the fastest range of dyestuffs—the anthraquinone vat dyes—to the animal fibers. In this sense, and as an official expresses it: "It may be that the evolution of the new series is to be regarded as the greatest post-war achievement in the British dyestuff industry, but, of course, the ultimate commercial success of the new series of dyes will depend largely on various economic factors."

The method of application consists in dyeing in a bath containing the dyestuff and Glauber salt only, afterward oxidizing in a separate bath. The material comes out from the dye bath a reddish-brown color, and only becomes green during the subsequent oxidation. The dyestuff is in paste form and the price quoted by the London agents of the manufacturer is 15/– per pound.

The following general instructions for the application of Soledon Jade Green are furnished and recommended by the agents of Scottish Dyes, Ltd.:

GENERAL INSTRUCTIONS

In dyeing, the amount of liquor used can be varied according to the material to be dyed and the type of dyeing machine available. As a general rule, the shorter the bath the better will be the exhaustion obtained. For yarn dyeing in the open beck, twenty times the weight of material is the minimum that can be used. This concentration is also advisable in dyeing woolen piece goods over the open winch. For piece dyeing in the jig a concentration of eight times the weight of the material can be used.

The dye paste is dredged into the bath through a sieve. Twenty per cent of crystalline Glauber salt or 10 per cent of common salt calculated on the yarn is then added to the dye bath. Dyeing is then commenced at 60 deg. Cent. and continued for half an hour, while the temperature of the bath is raised to 80 deg. Cent. The dyeing is then continued for a further half hour at this temperature, when the material is taken out and squeezed. In the case of wool dyeing the temperature may be taken to the boil and the bath may be finally exhausted with acid. The addition of acid at the beginning of the dyeing is not recommended.

In order to develop the shade the following alternative oxidation treatments are necessary: (a) Immersion for one minute in a cold solution of sodium nitrite. After squeezing well, a further immersion is given in a cold

1 per cent acid bath (either sulphuric acid or hydrochloric acid). (b) Developing can also be carried out in one bath with a cold 1 per cent persulphate solution acidified or a cold 1 per cent ferric chloride solution acidified. The operation is completed by rinsing free from acid, soaping in a bath containing 10 pounds of soap and five pounds sodium perborate per 100 gallons.

Soledon Jade Green can be applied also by the usual padding methods recommended for direct cotton colors, the aftertreatment being carried out as above.

The printing of Soledon Jade Green presents no difficulties, the color being merely thickened with any suitable gum, and printed direct. The goods are then subsequently steamed to fix the color and the shade developed as already stated above.

Notes

(1) If the dyeing is carried out at 100 deg. Cent., darker shades are obtained, but these may be duller.

(2) By increasing the amount of Glauber salt, the dyeing temperature can be carried out at 100 deg. Cent. without any loss in brightness. Consequently, when a standing bath is employed this method may be more economical. When dyeing silk, final exhaustion may be carried out with acetic acid.

(3) Development must be carried out in the cold.

(4) Exhaustion of the silk bath may also be carried out with the addition of acetic acid.

1924 DYE PRODUCTION AND SALES SHOW HEAVY DROP

Dyestuff production in the United States last year declined 28 per cent from that of 1923, according to preliminary figures contained in a recent report of the United States Tariff Commission covering production, exports and imports of coal tar dyes during 1924. The figures in this report were compiled for the annual Census of Coal Tar Dyes and other Synthetic Organic Chemicals, soon to be published.

Production of coal tar dyes during 1924 is approximated at 67,000,000 pounds with a value of about $36,000,000. Sales, totaling 63,000,000 pounds with a value, according to these preliminary figures, of $33,800,000, represented a 27 per cent decrease in quantity and a 28 per cent decrease in value from sales of 1925.

The prolonged depression in the textile industry is given as the principal reason for this decline in production and sales of dyes. This was obviously a large factor, for no matter how strong foreign competition in dyes might have been last year, our textile mills—those that were not shut down, those that were running on sharply curtailed production—did not require the quantity of dyes they would under normal industrial conditions.

"Among other factors contributing to a reduced production," explains the report, "were (1) stocks carried over from 1923, amounting to over 7,000,000 pounds; (2) increased imports following the 15 per cent reduction in the tariff, effective September 22, 1924, and (3) a reduction in exports amounting to over two million pounds."

A notable item in this report concerns a further reduction in domestic dye prices in 1924. Since 1917 the average price of domestic coal tar colors has fallen off steadily until in 1924 it reached a new low level of 5.35 cents per pound, 2 per cent less than the average of 1923. The report states in this connection: "The average sales price of Indigo in 1924 was less than 22 cents per pound compared with 23 cents in 1923. The current price of Indigo is 14 cents, which is below that of 1913 when our entire supply was imported from Germany and Switzerland."

Imports

Explaining the provisions of the tariff reduction on September 22nd and referring to its effect upon imports the report states:

"The average monthly imports of dyes for the period, October, 1924, to March, 1925, inclusive, was 452,636 pounds, a 153 per cent increase over the monthly average of the first nine months of 1924 preceding the reduction in duties on dyes. The improvement in the textile trade in the last three months of 1924 was a factor in the increased imports after September. The increase in the average monthly import since the tariff reduction indicates increased competition from foreign dyes. These dyes are almost entirely of German and Swiss origin and consist largely of the higher cost types of dyes used for special purposes."

This bears out the fact implied above, that our domestic dye makers were kept under greater strain during 1924 by the extreme conditions in the textile industry than by foreign competition in the dye markets. From this it might be deduced with reasonable certainty that the current year holds brighter prospects for the dye industry; though foreign competition probably will be stronger, greatly increased consumption by the domestic textile industry should exert a most beneficial effect upon our dye production and sales.

Relation of Production to Consumption

The imports of coal-tar dyes in 1924 were 4.5 per cent of the total production by quantity, and 8 per cent by value. They were by quantity 5.5 per cent of the apparent consumption, assuming this to be equivalent to production plus imports minus exports. The dyes produced in the United States, based on preliminary figures, accordingly, supplied about 94.5 per cent of the apparent consumption of coal-tar dyes, and in addition there was an exportable surplus of certain dyes.

Exports of Coal-Tar Dyes

The total exports of coal-tar dyes in 1924 totaled 15,713,091 pounds, a decrease of 2,211,445 pounds from that of the previous year. The value of the exports in 1924

was $5,635,064, an increase of $69,693 over that of 1923. These figures represent a decline of 12 per cent by quantity and an increase of 1 per cent in value. The decline in quantity in face of a slight increase in value is probably due to an increase in the quantity of indigo powder (100 per cent) exported in place of indigo paste (20 per cent).

Vat Dyes

A section of the report tells of the importance of vat dyes to the textile industry and their production in the United States. At the present time, it is stated, we are producing about one-half our requirements of this group of colors. The development of a range of vat dyes by our manufacturers is comparatively recent and has been one of the notable achievements of our dyestuff industry. During 1924 several important vats were reported for the first time—Golden Orange RRT and G, Hydron Orange R and Scarlet BB, and several blues and browns. Domestic production includes most of the important vat colors, those consumed in large quantities.

In 1924 the production of vat dyes other than Indigo was 1,340,000 pounds, as compared with a production of 1,766,383 pounds in 1923, a decline of 25 per cent, which is slightly less than the decline in the total output of all dyes.

New Colors

That additions to the line of colors produced in this country continued throughout 1924 despite curtailed production is evidenced by the many new and valuable dyes announced during the year by both large and small manufacturing units. The additions include colors previously imported, in certain cases, in large quantities. The report says: "Their manufacture in this country is an important step toward a self-sustained domestic dye industry. In addition to the new vat dyes already mentioned there were produced the prototypes of Diaminogen Blue, Trisulphon Brown B, Geranine, Cyananthrol RXO and BGAOO. Other additions include representatives of each class of dyes applied to cotton, silk, wool and leather, including several Alizarine dyes."

J. Young is the new manager of the intermediate and certified food color division of the National Aniline & Chemical Company of New York. He succeeds E. L. Rimbault, recently resigned.

The Fairmount Dye Works, Woonsocket, R. I., have changed hands. J. Manning, who has an interest in the new firm, will be manager of the plant. It is understood that James D. Minto, former manager of the company, will start another plant in Woonsocket.

Dr. H. Sheridan Baketel, for a number of years medical director of H. A. Metz Laboratories, Inc., New York, recently resigned to become director of the pharmaceutical laboratories of the National Aniline & Chemical Company, New York.

THE CHEMICAL EQUIPMENT EXPOSITION

Coincidental with the announcement of an important list of exhibitors at the Chemical Equipment Exposition, State Armory, Providence, June 22nd to 27th, inclusive, the Association of Chemical Equipment Manufacturings, sponsoring the exposition, has issued the following statement:

"Every American industrial executive is included in the general invitation to the exposition. Every technical man, whether employed in industry, an educator, or a consultant in any or all of the engineering and technological fields, is included in this invitation.

"The attendance will comprise owners, stockholders, bankers, executives, superintendents, foremen, purchasing agents, engineers and laboratory chiefs of companies in the chemical and chemically controlled industries, technical consultants, students and educators, Federal, State and local government technicians, experts and purchasing agents.

"Visitors will register at the entrance of the exposition. No individual printed invitations or tickets are required to admit qualified visitors. No favored groups of technical and industrial men are being chosen to comprise the attendance."

The current list of exhibitors, which may be obtained from the Association of Chemical Equipment Manufacturers, specifies several hundred items of equipment, supplies, accessories and materials essential to the chemical industry proper and to the following groups of chemically dependent industries: Heavy chemicals, dye, alcohol, fine chemicals, fertilizer, electrochemical, coal products, explosives, electrometallurgy, ferrous-metallurgy, petroleum, paint and varnish, soap, food products, non-ferrous-metallurgy, paper and pulp, leather, oil, wood products, ceramics, rubber, lime and cement, sugar, animal products, which will be displayed.

In conjunction with the exposition, the American Institute of Chemical Engineers will hold four-day sessions, and there will also be special meetings of sections of the American Association of Textile Chemists and Colorists.

NEW DIAZO BLUES OF CIBA COMPANY

The Ciba Company has announced to the trade the addition to its already existing brands of Diazo Fast Blues, known as Diazo Fast Blue BBW, RW and 2RW, the following new brands: Diazo Fast Blue 4GW Conc., 6GW Conc., 2GL, BW, BRW, 4RW, and 6RW.

The line now includes a complete range from extremely greenish blues to those with a decidedly reddish cast. A very attractive sample card covering the entire line has been prepared and is ready for distribution upon request.

Foreign Dyes Imported Through New York and Other Ports During March

Compiled by the Chemical Division of the Bureau of Foreign and Domestic Commerce in Collaboration with the Chemical Division of the United States Tariff Commission

KEY TO ABBREVIATIONS OF MANUFACTURERS' NAMES

1—THE SIX LEADING GERMAN COMPANIES

A—Actien-Gesellschaft fur Anilin-Fabrikation, Berlin. Founded 1873.

B—Badische Anilin-und-Soda-Fabrik, Ludwigshafen-on-the-Rhine. Founded 1865.

By—Farbenfabriken, vormals Friedr. Bayer & Co., Leverkusen-on-the-Rhine. Founded 1862.

C—Leopold Cassella & Co., Frankfort-on-the-Main. Founded 1870.

K—Kalle & Co., A. G., Biebrich-on-the-Rhine. Founded 1870.

M—Farbwerke, vormals Meister Lucius & Bruning, Hochst-on-the Main. Founded 1862.

2—THE SMALLER GERMAN COMPANIES

BK—Leipziger Anilinfabrik Boyer & Kegel, Furstenberg, near Leipzig. Founded 1882.

CG—Chemikaliewerk Griesheim G. m. b. H., Griesheim-on-the-Main. Founded 1882.

CJ—Carl Jager G. m. b. H., Anilinfarbenfabrik, Dusseldorf. Founded 1823

GrE—Chemische Fabrik Griesheim-Electron, Offenbach-on-the-Main. Founded 1842.

L—Farbwerk Mulheim, vormals A. Leonhardt & Co., Mulheim-on-the-Main. Founded 1879

tM—Chemische Fabriken, vormals Weiler ter Meer, Uerdingen-on-the-Rhine. Founded 1877.

WD—Wulfing, Dahl & Co., A. G. Barmen. Founded 1842.

3—SWISS COMPANIES (ALL AT BASEL)

DH—Farbwerke vormals L. Durand, Huguenin & Co. Founded 1871.

G—Anilinfarben-und Extract-Fabriken, vormals Joh. Rud. Geigy. Founded 1764.

I—Gesellschaft fur chemische Industrie. Founded 1885.

S—Chemische Fabrik, vormals Sandoz & Co. Founded 1887.

4—DUTCH AND FRENCH COMPANIES

FA—Farbwerk Ammersfoort, Ammersfoort, Netherlands. Founded 1888

NF—Niederlandische Farben-und-Chemikalienfabrik Delft, Delft, Netherlands. Founded 1897.

CN—Compagnie Nationale de Matieres Colorantes et Produits Chimiques. Founded 1917. (Etablissements Kuhlmann merged with this company in 1923.)

P—Societe Anonyme des Matieres Colorantes et Produits Chimiques St. Denis (formerly A. Poirrier). Founded 1830.

5—ENGLISH COMPANIES

Bro—Brotherton & Co., Ltd., City Chambers, Leeds.

BAC—British Alizarine Co., Ltd., Manchester

BD—British Dyestuffs Corporation, Ltd., London.

Cl Co.—The Clayton Aniline Co., Ltd., Clayton, Manchester.

CV—The Colne Vale Dye & Chemical Co., Ltd., Milnsbridge, Huddersfield.

Hol—L. B. Holliday & Co., Ltd., Huddersfield.

Scot—Scottish Dyes, Ltd., Grangemouth.

IMPORTS of coal-tar dyes for the month of March, 1925, by ports are as follows:

	Pounds	Invoice Value
New York	514,677	$478,607
Boston	9,160	6,195
Providence	3,925	3,472
Philadelphia	102	117
Detroit	100	110
Total	527,964	$488,501

Dyes Remaining in Bonded Customs Warehouse

	Coal-Tar Dyes and Colors (pounds)	Coal-Tar Intermediates (pounds)
August 31, 1924	507,338	1,081,287
September 30, 1924	559,661	1,111,656
October 31, 1924	552,556	1,050,037
November 30, 1924	533,760	1,031,460
December 31, 1924	575,051	1,086,108
January 31, 1925	571,371	952,202
February 28, 1925	566,038	961,406

Five Leading Dyes, by Quantity, Imported During March

Rhodamine B	39,540 pounds
Brilliant Indigo 4B	27,209 pounds
Ciba Violet B	23,803 pounds
Indanthrene Yellow G	16,776 pounds
Rhodamine 6G	14,155 pounds

Imports for First Three Months

1925—	Pounds	Invoice Value
January	403,984	$359,376
February	373,259	365,268
March	527,964	488,501
Total, three months	1,305,207	$1,213,145

1924—	Pounds	Invoice Value
January	238,643	$237,868
February	161,869	180,570
March	302,799	307,247
Total, three months	703,311	$725,685

Per Cent by Country of Shipment

March, 1925

Germany	49	England	2
Switzerland	39	Belgium	2
Italy	5	France	1
Canada	2	Holland	—

February, 1925

Germany	54	England	5
Switzerland	27	Belgium	3
Italy	6	France	1
Canada	3	Holland	1

Imports of Color Lakes

	Pounds	Invoice Value
January	385	$728
February	2,112	1,926
March	5,422	2,061

The dyes in this report are grouped by Schultz numbers, and in the case of those which could not be identified by Schultz number the classification according to the ordinary method of application was adopted. As the pastes and powders of the vat dyes vary widely in strength and quantity, each vat dye has been reduced—in nearly every case—to a single-strength basis.

The designation of "†" for competitive and "*" for non-competitive indicates the appraisement basis for the assessment of the ad valorem duty in paragraph 28 of the Tariff Act of 1922. In the case of those dyes without designation, the appraisement basis had not been determined at the time of the collection of the statistical information in this report.

The ad valorem rate for competitive dyes is based on the American selling price as defined in Subdivision (f) of Section 402 of Title IV; the ad valorem rate for non-competitive dyes is based on the United States value as defined in Subdivision (d) of Section 402 of Title IV of the Tariff Act of 1922.

DYES OF COAL-TAR ORIGIN*

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
2	*Fast Printing Green—(By)	668
19	Kiton Fast Yelow 3G—(I)	1,984
64	Sorrel Red X—(B)	500
88	*Acid Anthracene Brown PG—(By)	375
96	Chrome Fast Yellow 2G—(A)	100
121	†Erica B Conc.—(S)	220
132	Red for Lake P Paste—(M)	20
140	*Chromocitronine R—(DH)	
140	Jasmine Highly Conc.—(G)	2,137
153	Red for Lake C Extra Paste—(M)	20
159	Acid Alizarine Black R—(S)	2,001
173	Lithol Red R Paste—(M)	20
175	*Acid Ponceau E—(G)	440
177	Milling Yellow O—(C)	500
194	Chicago Red III—(G)	1,653
206	Diphenyl Catechine G Supra—(G)	2,205
207	*Diphenyl Fast Brown GF—(G)	
207	*Diphenyl Fast Brown GNC—(G)	2,756
212	Acid Brown RN—(G)	110
217	Naphthylamine Black 4B—(B)	200
227	†Cotton Scarlet Extra—(B)	200
257	†Coomassie Navy Blue GNX—(BD)	
257	*Sulphon Cyanine G—(By)	400
279	†Benzo Fast Orange S—(By)	
279	†Benzo Fast Orange WS—(By)	
279	†Benzo Fast Scarlet 4BS—(By)	
279	†Benzo Fast Scarlet 8BS—(By)	999
296	†Chlorantine Fast Yellow 4GL—(I)	2,204
319	Chlorantine Red 3B—(I)	
319	†Diamine Scarlet 3B—(C)	1,110
332	Benzo Fast Red 8BL—(By)	
332	Fast Cotton Red 8BL—(A)	600
343	Diamine Fast Red 8BL—(C)	168
348	Diphenyl Brown GS—(G)	551
358	Chloramine Brilliant Red 8B Conc.—(S)	
358	Toluylene Red—(Gr.E)	1,448
373	*Congo Orange R—(A)	1,000
392	*Direct Fast Orange K—(I)	
392	Pyrazol Orange G Conc.—(S)	
392	*Toluylene Fast Orange GL—(By)	5,298
400	†Acid Milling Red G Conc.—(G)	
400	†Acid Milling Red R Conc.—(G)	
400	Brilliant Milling Red R—(C)	1,602
418	†Diamine Brilliant Blue G—(C)	200
424	†Diamine Sky Blue FF—(C)	
424	†Brilliant Benzo Blue 6B Conc.—(By)	300
448	Brilliant Bronze G—(C)	200
449	†Trisulphon Brown B Conc.—(S)	2,028
456	†Benzo Fast Blue 4GL—(By)	2,179
472	*Chloramine Blue HW Conc.—(S)	928
496	Setoglaucine—(G)	551
503	Benzyl Green B—(I)	
503	†Poseidon Green SGX—(B)	1,071
505	Light Green SF Yellowish—(B)	100
506	Erioglaucine AP—(G)	
506	*Erioglaucine Supra—(G)	3,586
508	Xylene Blue AS Conc.—(S)	2,001
516	†Crystal Violet Extra Powder—(B)	800
518	Ethyl Violet—(B)	500
523	*Fast Green Extra Bluish—(By)	1,488
528	Kiton Fast Violet 10B—(I)	771
530	†Acid Violet 6B—(t-M)	1,000
531	†Eriocyanine AC—(G)	500
537	Methyl Lyons Blue—(G)	1,102
541	Brilliant Dianil Blue 6G—(M)	
541	Brilliant Sky Blue 5G—(By)	300

*This table includes imports through the port of New York to the amount of 514,677 pounds, and also 9,160 pounds through the port of Boston, 3,925 pounds through the port of Providence, 102 pounds through the port of Philadelphia and 100 pounds through the port of Detroit.

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
543	†Poseidon Blue BGX Conc.—(B)	400
545	†Acidol Blue A—(t-M)	
545	*Brilliant Acid Blue FF—(By)	717
546	*Cyanol Extra—(C)	200
548	†Acid Violet 6BNOO—(B)	200
549	*Brilliant Chrome Violet 4B—(DH)	110
551	*Brilliant Blue G—(By)	
551	*Eriochrome Azurol BC—(G)	4,971
553	*Eriochrome Cyanine RC—(G)	2,205
557	Chrome Violet CG—(DH)	220
559	Victoria Blue B Base—(I)	
559	*Victoria Pure Blue BO—(B)	3,851
560	*Night Blue—(I)	441
562	*Acid Blue RBF—(I)	
562	Intensive Blue B—(By)	541
564	†Erio Green B Supra—(G)	
564	Xylene Fast Green B Conc.—(S)	2,102
570	Rhodamine S—(I)	110
571	*Rhodamine 6G Extra—(I)	
571	*Rhodamine 6GDN Extra—(B)	
571	*Rosazeine 6G Extra—(M)	14,155
573	†Rhodamine B Extra—(B)	
573	†Rhodamine B Extra—(I)	
573	Rosazeine B Extra—(M)	39,540
579	Sulpho Rosazeine B Extra—(M)	50
582	Fast Acid Violet R—(M)	500
587	Eosine W Extra—(B)	100
603	*Acridine Orange DHE—(DH)	
603	*Brilliant Acridine Orange A—(DH)	1,102
606	†Coriphosphine OX Extra—(By)	
606	†Philadelphia Yellow 2G—(Gr.E)	
606	Phosphine 3R—(A)	2,892
608	Patent Phosphine RRDX—(B)	300
609	Flavophosphine G Conc.—(M)	290
613	†Quinoline Yellow Conc.—(S)	2,001
618	*Rhoduline Yellow 6G—(By)	278
620	Capri Blue GON Conc.—(L)	110
627	Anthracyanine S—(DH)	
627	*Chromacetine Blue S Extra—(DH)	
627	Modern Cyanine N—(DH)	550
635	Blue 1900 TCD—(DH)	
635	Modern Violet—(DH)	1,542
637	Gallamine Blue Extra Paste—(G)	2,535
645	*Gallazine No. 90 Powder—(DH)	220
661	Thionine Blue G—(I)	
661	*Thionine Blue GO—(M)	1,302
663	New Methylene Blue N—(C)	500
672	Azo Carmine GX—(B)	1,334
673	*Rosinduline 2B Bluish—(K)	899
687	Methylene Heliotrope Ex. Strong—(M)	
687	*Rosolane Extra Strong—(M)	510
699	†Induline NN—(B)	50
705	Indocyanine B—(A)	2,000
712	Sulphur Yellow G Extra—(A)	1,000
720	Sulphur Black FAG Extra—(A)	25
733	†Immedial Indogene GCL—(C)	500
746	Pyrogene Blue Green B—(I)	15
759	*Anthra Yellow GC Paste—(B)	
759	*Anthra Yellow GC Powder (s. s.)—(B)	
759	*Vat Yellow GC Paste—(B)	5,463
760	*Indan. Golden Orange G Double Paste (s. s.)—(B)	
760	*Vat Golden Orange G Double Paste (s. s.)—(B)	
760	*Vat Golden Orange G Dbl. Pst.—(B)	
760	†Vat Golden Orange G Pdr. (s. s.)—(B)	5,067
761	*Vat Orange RRT Paste—(B)	
761	Vat Orange RRT Paste Fine—(B)	
761	Vat Orange RRTS Powder (s. s.)—(B)	10,628
762	*Vat Orange 4R Paste—(B)	503
763	†Vat Dark Blue BOA Paste—(B)	2,080
763	Vat Dark Blue BGO Paste Fine—(B)	
763	Vat Dark Blue BGO Powder (s. s.)—(B)	1,778
765	†Vat Black BB Obl. Pst. (s. s.)—(B)	
765	†Vat Black BB Powder (s. s.)—(B)	3,409
767	†Indan. Violet RR Powder (s. s.)—(B)	856
778	Alizarine Red DIB New—(M)	
778	†Alizarine VI Extra Pure—(B)	8,240
779	Alizarine Orange R Paste—(M)	1,750
780	Alizarine Red SV Powder—(B)	
780	†Alizarine Red W Powder—(By)	1,813
783	†Purpurine—(By)	1,949
785	Alizarine Red SDG Paste—(M)	1,500
787	*Alizarine Bordeaux BP Paste—(By)	
787	*Brilliant Aliz. Bordeaux R Pst.—(By)	641
790	Anthracene Blue SWGG Powder—(B)	200
792	*Cibanone Orange R Paste—(I)	
792	Cibanone Orange R Powder (s. s.)—(I)	4,251
793	Cibanone Blue 3G Paste—(I)	110
794	*Cibanone Black B Paste—(I)	1,102
795	*Cibanone Yellow R Paste—(I)	
795	*Cibanone Yellow R Powder (s. s.)—(I)	10,576
803	*Alizarine Blue R—(B)	74
804	*Alizarine Blue S Powder—(By)	
804	Alizarine Blue SB Powder—(M)	2,985
810	Helindone Yellow 3GN Paste—(M)	500
819	*Algol Red FF Ex. Pdr. (s. s.)—(By)	1,760
822	Vat Orange R Powder (s. s.)—(Gr.E)	1,096
825	*Algol Red B Paste—(By)	399
827	*Anthra Bordeaux R Paste Fine—(B)	841
830	*Anthra Red RT Paste—(B)	
830	Anthra Red RT Powder (s. s.)—(B)	6,279
831	Helindone Red DIBN Ex. Pst.—(M)	
831	*Vat Red RK Paste—(B)	2,852
832	Vat Violet BN Powder (s. s.)—(B)	
832	*Vat Violet BN Extra Powder (s. s.)—(B)	1,796
833	Vat Olive R Paste—(By)	399
834	*Vat Gray GK Paste—(By)	794
838	Indan. Blue RS Triple Powder (Single Powder)—(B)	324
842	Helindone Blue IGCD Pdr. (s. s.)—(M)	
842	†Indan. Blue GCD Dbl. Pst. (s. s.)—(B)	
842	Vat Blue GCD Dbl. Pst. (s. s.)—(B)	

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
842	Vat Blue GCDN Powder (s. s.)—(B)	6,978
849	Helindone Yellow 1G Double Paste (s. s.)—(M)	
849	†Indan. Yellow G Paste—(B)	
849	†Indan. Yellow G Dbl. Pst. (s. s.)—(B)	
849	†Vat Yellow G Dbl. Pst. (s. s.)—(B)	
849	Vat Yellow G Dbl. Pst. Fine (s. s.)—(B)	
849	Vat Yellow GT Paste—(B)	16,776
851	Alizarine Direct Blue B—(M)	
851	Alizarine Leveling Blue B—(C)	1,000
853	Anthraquinone Violet Powder—(B)	900
854	*Alizarine Viridin FF Paste—(By)	399
855	*Alizarine Blue SKY—(B)	
855	*Alizarine Sky Blue B—(By)	5,549
856	*Alizarine Astrol B—(By)	
856	Alizarine Blue AS—(By)	1,635
858	†Alizarine Light Blue B Conc.—(S)	
858	Alizarine Sapphire Blue SE—(I)	3,284
860	*Alizarine Direct Blue BGAOO—(B)	1,264
862	†Alizarine Blue Black B Powder—(By)	
862	†Alizarine Blue Black 3B Powder—(By)	9,896
863	Anthraquinone Blue Green BXO Powder—(B)	100
865	†Alizarine Cyanine Green G Extra Powder—(By)	1,324
868	*Cibanone Brown B Powder—(I)	1,001
869	*Vat Brown R Paste—(By)	
869	Vat Brown IR Paste—(M)	
869	Vat Brown R Paste—(B)	4,025
870	*Vat Corinth RK Paste—(By)	399
871	Vat Red Violet RRK Paste—(B)	
871	*Vat Red Violet RRK Paste Fine—(B)	1,825
876	Indigosol O4B—(DH)	
876	Indigosol O4B—(By)	320
881	†Brilliant Indigo 4B Paste—(B)	
881	†Brilliant Indigo 4B Pdr. (s. s.)—(B)	
881	Indigo MLB/4B Paste—(M)	27,209
883	Indigo MLB/6B Powder (s. s.)—(M)	1,500
885	Brilliant Indigo B Paste—(B)	1,550
890	*Ciba Yellow G Paste—(I)	551
894	*Alizarine Indigo Green B Paste—(By)	419
896	Helindone Blue 3R Paste—(M)	500
901	*Ciba Violet B Paste—(I)	
901	Ciba Violet B Powder (s. s.)—(I)	23,803
907	*Ciba Scarlet G Extra Paste—(I)	
907	*Ciba Scarlet G Ex. Pdr. (s. s.)—(I)	
907	Thioindigo Scarlet 2G Paste—(K)	
907	Vat Scarlet 2G Paste—(K)	10,683
908	Ciba Red R Paste—(I)	1,984
910	*Anthra Pink AN Paste—(B)	
910	Helindone Pink AN Paste—(M)	2,000
910	*Thioindigo Rose BN Ex. Pst.—(K)	1,000
912	*Anthra Red B Paste—(B)	
912	*Ciba Pink B Paste—(I)	
912	Vat Red B Powder (s. s.)—(B)	2,269
913	Helindone Orange R Powder (s. s.)—(M)	
913	†Hydron Orange RF Paste—(C)	
913	†Hydron Orange RF Pdr. (s. s.)—(C)	
913	Thioindigo Orange R Paste—(K)	8,928
918	Ciba Red 3B Paste—(I)	
918	Helindone Reddish Violet IRH Paste—(M)	
918	Vat Red Violet RH Paste—(B)	4,909
919	*Ciba Bordeaux B Powder (s. s.)—(I)	3,310
920	*Helindone Violet R Paste—(M)	
920	Helindone Violet R Pdr. (s. s.)—(M)	
920	Thioindigo Violet 2B Pdr. (s. s.)—(K)	
920	Thioindigo Violet 2R Pdr. (s. s.)—(K)	4,563
923	Fur Brown 2R—(A)	
923	*Fur Brown 4R—(A)	
923	Fur Olive 6G—(Gr.E)	
923	*Fur Red Brown 6R—(A)	205

UNIDENTIFIED DYES

Acid Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Acid Anthracene Red 3BL—(By)	200
Acid Pure Blue R Supra—(G)	1,102
*Acid Rhodamine BG—(B)	470
Acid Rhodamine 3R—(I)	1,322
Alizarine Direct Blue A—(M)	1,000
Alizarine Direct Red 2B—(M)	100
*Alizarine Rubinol GW Powder—(By)	
*Alizarine Rubinol 5G Powder—(By)	
Alizarine Rubinol R Powder—(By)	651
*Alizarine Uranole BB Powder—(By)	299
Amido Naphthol Black 4B—(M)	50
Azo Acid Black B—(M)	500
Azo Brilliant Violet BB—(M)	10
Azo Wool Violet 7R—(M)	200
Benzyl Fast Blue L—(I)	110
Brilliant Acid Blue G—(I)	110
*Brilliant Milling Blue B—(C)	1,300
*Cashmere Black TN—(By)	400
Cloth Fast Yellow G—(I)	1,763
Fast Acid Green BB—(M)	500
†Guinea Fast Red BL—(A)	100
*Metanil Red 3B Extra—(By)	100
Milling Brown R—(A)	100
*Milling Orange G—(A)	100
*Milling Yellow GA—(A)	200
*Neolan Green B—(I)	551
Neolan Pink G—(I)	220
Neolan Yellow R—(I)	110
Neutral Violet O—(M)	25
Onis (Anthosine) 3B—(B)	250
Polar Red G Conc., R Conc.—(G)	2,755
Polar Yellow 2G Conc.—(G)	794
*Poseidon Blue BR Extra—(B)	2,100

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Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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FEBRUARY MEETING OF THE NEW YORK SECTION

The regular monthly meeting of the New York Section of the American Association of Textile Chemists and Colorists convened in Stewart's Restaurant, 30 Park Place, New York City, at 8.15 P. M., February 27th, E. F. L. Lotte presiding.

After the routine business of the Section was transacted, Chairman Lotte introduced the speaker of the evening, F. P. Bascom, of Lockwood, Greene & Co.

Mr. Bascom presented a prepared paper, entitled "Dye House Construction," as follows:

Dyehouse Construction

By F. P. BASCOM
Lockwood, Greene & Co.

[*Several lantern slides were shown during the presentation of this paper, but as they could not be obtained for publication only a few are mentioned in the text.*—ED.]

In the design of a dyehouse, regardless of its use, there are certain results which it is desirable to obtain: (1) A well laid out equipment of machinery designed to reduce the operating costs to a minimum; (2) permanent construction which will reduce the upkeep to a minimum; (3) proper ventilation; (4) the maximum lighting effect; (5) the maximum comfort for the operatives; (6) elimination of damaged goods.

With these results as an objective the design of each dyehouse is a problem in itself, since the actual operating conditions vary with the material itself whether it be cotton, silk or wool; with the manufactured condition of the material, whether it is in the raw stage or in the form of yarn or piece goods, and with the machines selected to do the work.

In the selection of machines to do the work there is necessarily a wide divergence of opinion among the various dyers, but I think there are certain factors which should be considered in making a choice:

1. The dyeing results to be obtained.
2. The economy in the use of dyestuffs.
3. Economy in labor.
4. Economy in the use of power and steam.
5. Economy in upkeep.
6. Initial costs.

Of these the dyeing results are the most important since low costs are no good unless the results are satisfactory.

Economy in the use of dyestuffs is also important, since these costs run up rapidly. I believe that this is obtained when there is the greatest circulation of dye liquor through the material to be dyed or of the material through the dye liquor.

Economy in the use of labor is also very important and presents one of the greatest chances for saving in the business. I have in mind particularly the hand poling in raw stock wool dyeing and the use of Scotch tubs on yarn dyeing.

On raw stock dyeing the right type of dyeing machines and the use of conveyors, fans, etc., will eliminate a great deal of labor.

On piece dyeing of fabrics, particularly cotton, the use of ranges will cut out much of the labor in the plant, and I believe produce more uniform results.

As between power and steam everything is in favor of trying to save the steam, since excess use of steam must

also be considered in connection with the ventilation equipment. I have in mind one plant where the umbrella type of circulation was used on raw stock wool tubs and was using about 3,000 pounds of steam per hour per tub, or the equivalent of a 100 h.p. boiler. This involved not only an excessive steam load but also a serious difficulty in proper ventilation.

Economy in upkeep involves the right selection of materials of construction for the machines and of driving equipment. I believe that individual motor drives are the right solution in many cases since they do away with rusted shafting, slipping and wearing of belts, and also avoid spots on the goods from either dropping oil or water.

The initial cost of the installation should be given the least consideration, since the savings on a proper installation will usually show a quick return on the investment.

Construction

Permanence is the great essential in construction.

The buildings may be of various types of construction. The one-story building has many things in its favor, but we have several plants in which the dyehouse is either in the first story or the top story of a multi-story building, these locations being necessary or advisable on account of the routing of the stock or because land values made a one-story building out of the question.

At the present time we have rather an interesting proposition where various classes of dyeing in a plant, now scattered all over the plant, are being concentrated in one building, and owing to local conditions it has been necessary to plan on a three-story dyeing building containing approximately 100,000 square feet of floor space.

The walls may be of either brick or concrete, although there will be more condensation from a concrete wall.

The sash may be either wood or steel, but we believe that wood sash is very much to be preferred. In either case they must be kept well painted; the air leakage will be considerably higher with the steel sash.

Roofs have been made of various materials such as wood, concrete, gypsum, etc. I am inclined to think a roof consisting of chemically treated plank, with a good insulation and either a tar and gravel or asphalt roof, is the best that has been installed up to the present time.

A concrete roof has permanence but stays cold at all times, and unless warm air currents are projected along its surface, will cause condensation if there is any moisture in the air in the room.

Gypsum has had a tendency to peel where there is moisture, although it is claimed that this objection has now been overcome.

Several materials have been successfully used for flooring, including concrete, vitrified brick, wood blocks and mastic paving blocks. Where there is very little trucking and no acids, the concrete floor is very satisfactory. Ordinary mastic has been used, but where heavily loaded trucks are in service it will not give good service even when reinforced with grid work, as was done in one case.

Floors should be pitched and have plenty of drainage. As much of the water as possible should be drained at the machines, the other floor drains being planned to take care of drainage from trucks, etc.

Ventilation

The proper ventilation of the dyehouse to prevent fog and condensation is one of the most important parts of its construction and the one which calls for the most knowledge of conditions and the greatest engineering skill. There is no branch of engineering where theory is so dangerous or past experience so valuable as in the design of ventilation.

I think that there are two basic conditions necessary for successful ventilation: (1) The removal of enough air to pick up the steam being given off by the machines; (2) The replacement of that air by warm air.

The amount of air and the methods for handling that air will vary greatly according to the type of machines, the class of stock, and other conditions.

A cotton goods piece dyeing machine where low temperatures are being employed is entirely different from a heavy plush piece dye or a wool raw stock dyeing tub where furious boiling is the usual practice. Also it makes a great deal of difference whether there are automatic controls on the machines. Again, the question of hoods plays an important part. A closely hooded machine will require much less air than one with higher hoods and very much less than one without hoods. Kettles have been so hooded and the exhaust stacks so proportioned that practically no air was entrained with the steam as it left the kettle and passed the opening in the front of the hood above the dye tub.

There are three general methods by which the ventilation can be accomplished:

1. Blowing in heated air under pressure and depending on ventilators to remove the saturated air.

2. Removal of the saturated air by suction fans and the replacement of air by suction over coils.

3. A combination of the first two methods.

Where the first method is employed, it is necessary to carefully design the air carrying ducts to give the right quantities of air at the various parts of the working space, and to so design the nozzles that there will not be uncomfortable drafts in the working areas. For certain types of construction it is also necessary to provide air currents on the ceilings to prevent condensation.

The outlets for the exhaust air may be of various types of construction, that is, natural ventilators or mechanical ventilators at different parts of the plant or natural or mechanical ventilators attached to hoods over the steam producing machinery.

Where the second method is employed there may be hoods over the machines with individual exhaust fans for each hood or the various hoods may be connected to one or more large exhaust fans.

The third method is simply a combination of these two methods and has a large supply system under pressure and a fan exhaust system.

The method to be employed in any particular case will depend on the types of machines to be used, the amount of steam to be handled, the size and location of the building, the character of the adjoining rooms and buildings, and the amount of money the owner is willing to spend to get ideal conditions. One man has stated that every dyehouse installation is the result of compromise, and I think that is an exact statement of facts.

I think an ideal dyehouse would be one in which there would be no hoods to shut off light or obstruct the view of the goods during the dyeing process, no fog and no condensation. This type, however, would be the most expensive that could be built, both from the standpoint of initial investment and from that of operating cost.

The cheapest construction would be that where the steam-producing machines are closely hooded, since this is the one where the least amount of air would have to be handled. There are objections to this type since the goods being dyed are not open to view (I have particularly in mind piece dyed woolens, etc.) and for some classes of goods requiring a certain amount of oxidization where there may not be enough air to give satisfactory results.

In between these two methods lies that where the hoods are opened enough to permit a view of the goods during the dyeing period, and a moderate amount of fresh warmed air is supplied both at the roof and in the working space.

At this point it might be well to refer to the different materials used for hood construction. For this purpose ordinary Southern pine, white pine, cypress, special plied wood, galvanized iron, copper, leaded metal, aluminum, and canvas on cypress frames have been used.

Of these the ordinary woods decay too fast, cypress is very satisfactory, the plied wood has great possibilities, galvanized iron rusts, copper is very expensive, leaded metal and aluminum have been fairly successful and the canvas is by far the cheapest and on the whole one of the most satisfactory.

A well-lighted dyehouse is very desirable, and the best lighting occurs when there are no hoods to obstruct the light. With a narrow building and a large glass area there is no difficulty in obtaining the necessary lighting, but when a large area is covered by the dyehouse, the lighting problem becomes more serious.

With a multi-story building this difficulty can only be overcome by increasing the story heights. In the one story building the use of saw teeth, monitors or skylights will give satisfactory lighting results, but may require special designs of ventilation equipment to avoid condensation.

The maximum comfort for the operatives occurs when there is plenty of light, a complete elimination of fog and condensation, and when the ventilation system is so designed as to prevent uncomfortable drafts of air.

[Slide.] There is a raw stock dyehouse, showing the ventilators and the conditions on the floor. That particular floor, I think, is made of mastic blocks. In that case there were no hoods at the tubs. They were depending altogether on the ventilators to take off the steam, and the warm air is carried in through these nozzles. Each of these has a damper so that they can be reflected either down to the floor or sidewise.

[Slide.] There is a piece goods dyehouse without any hoods at all. You will note that everything is open. I will discuss that particular dyehouse a little further. I have plans that will give you a little more detail as to the construction. It is a mastic floor; there is a continuous trench running along under those dyeing machines with planks between the machines themselves.

As an illustration of the various types of dyehouse construction which may be used, I am taking three dyehouses of radically different designs and uses for discussion.

The first is a dyehouse for dyeing raw stock cotton, and is interesting on account of the size of the installation, the methods of handling, and because it illustrates two entirely different methods of ventilation.

There are two buildings marked "A" and "B." "A" is an old two-story concrete building in which there are eight Delahunty machines on the first floor, in their original positions. The dryers were originally on the second floor of this building and an old building adjoining this building which was torn down to provide room for an extension to the boiler house. "B" is a new four-story concrete building with space for sixteen vacuum dyeing machines on the first floor, dryers on the second and third floor and storage bins for dyed stock on the fourth floor.

Dyestuffs are taken to the second floor of building

"A," weighed, mixed in a special mixing machine delivered to a large scoop with weighing attachment and run on a trolley to the storage bins and dumped. From these it is taken as required to the mixing kettles, one of these being provided for each dyeing machine.

The sodium sulphide and salt are taken on the elevator to the third floor of building "B" where they are delivered by chutes to the mixing tanks on the second floor of building "A."

Near each dyeing machine there is a storage tank for dyeing liquor from which the liquor is drawn for circulation. Mounted on this is a smaller tank into which the dye liquor is drawn from the mixing kettles and in which the other ingredients are added.

For every dyeing machine there is a hydro-extractor with an automatic feeder and blower fan for each two extractors. These are arranged to require as little work in handling as possible, and blow the wet cotton to the automatic feeders attached to the stock dryers on the second and third floors of buildings "B."

These dryers deliver into hoppers from which the cotton is taken by fans and delivered to the bins on the fourth floor. Each fan can deliver to any one of six bins and there is another blowing system on the fourth floor which permits the mill to take cotton from any bin and deliver the cotton either up or down the river to any one of thirty or forty bins at either end.

This dyehouse has a capacity of nearly 90,000 pounds per day of dyed or bleached stock.

The Delahunty machines were originally built with closed-in hoods, but to get satisfactory results, these were partially removed with the result that when I first saw this dyehouse the fog was so dense that it was impossible to see anything five feet away.

When the dyehouse was remodeled all of the old hoods were removed and replaced by large cypress hoods which overhung the machines and were about seven feet from the floor. These were connected by cypress uptakes to a cypress duct which in turn delivered to an exhaust chamber in which was installed a No. 12 Double Turbo Conoidal Fan.

Warm air is delivered into this room and also into the first story of building "B" through vento heaters, a No. 15 Conoidal Fan and galvanized iron ducts, with drops to within 7 feet of the floor and also discharges openings along the ceilings.

At four points in building "B" there are uptakes 9 by 6 feet with two 72-inch Swartout ventilators installed on each. These are so arranged that they operate together. The exhausts from the dryers on the second and third floors also discharge into these risers.

Building "B" is of flat slab concrete construction with panels 20 by 22 inches. The first story has pits to receive the dyeing machines, the discharge from these being direct into the river since the entire dyehouse is built over the river. This floor has Hastings paving blocks for the top surface and the other floors have a granolithic top surface.

No. 2 is a worsted dyehouse arranged to take ten kettles at the present time and two more in the future. The building is one story, of an odd shape to fit the ground conditions, and has concrete walls and floor, steel sash and a wood monitor roof. The floors have a granolithic finish and trenches for the machines. Each machine has a canvas hood supported on a wooden frame and canvas flaps.

On top of these is mounted a 42-inch special wood and copper unit ventilator with a special discharge vent of wood with copper covering on the outside. The top of each is arranged to be opened to various degrees by a special mechanism.

For supply of warm air to the building there is a heater and supply fan discharging air through ducts at the ceilings.

No. 3 is a dyehouse arranged to take eighteen dye kettles operating on very heavy mohair robes, and presenting the worst condition which we have ever encountered in piece goods dyeing.

This dyehouse differs radically from most others, since the air is taken out by two specially designed natural ventilators running the full length of the dyeing space, and there are no hoods over the tubs.

The building is of concrete construction with brick curtain walls, concrete floor with Hastings block finish, concrete roof and wood ventilators covered with asbestos shingles.

The dye tubs set in continuous trenches with creosoted plank in between the tubs.

The warm air is supplied by a No. 15 Conoidal Fan with vento radiation for heating, and is distributed through ducts which discharge the air along the ceiling and through vertical ducts into the working space.

As an illustration of the treatment of an old dyehouse, I would like to take up an installation made in 1918. In this dyehouse there are thirteen piece dye tubs working on fine woolens. The dyehouse is 133 feet long and 35 feet wide, with a wet finishing room along one side, so that it is lighted only at the ends and on one side. It has a story height of 14 feet and the second floor of the building is used for wool storage.

Originally over each machine there was an individual hood and ventilating shaft which carried up through the roof to a height of 5 feet above the roof with louvre ventilators on four sides. These were 5 feet square at the dyehouse ceiling and 3 feet square

at the roof, and were supposed to give natural ventilation.

This installation was made in 1904. In 1907 the material had decayed to such an extent that they were replaced with kyanized stock.

This was not satisfactory and they later installed disc fans in the wall to help out the ventilation.

In 1918 we were called in and made a new installation consisting of a warm air supply system through heater, fan and ducts, and an exhaust system with four disc fans in the windows and a vertical exhaust through a larger fan and cowl ventilator.

This installation has been entirely satisfactory without hoods for the machines.

(Applause.)

Discussion

Chairman Lotte—I am sure that Mr. Bascom will be glad to answer any questions you may care to ask him.

Herbert Grandage—Mr. Bascom, you mentioned the treatment of a wooden roof. Just what did you mean by that? Did you mean kyanizing or something similar to that?

Mr. Bascom—We do not like kyanizing, and we do not like creosote, because that is liable to drop off. What we are using now is sodium fluoride, which will stand paint over it. The other materials will not stand paint. If you paint them white, the yellow will show right through them.

Mr. Grandage—It comes down then to a wooden roof painted on top.

Mr. Bascom—You can paint on top of the roof. You see, there are two ways of putting on the sodium fluoride treatment. One is under pressure and the other is in open tanks treated for about twenty-four hours in boiling liquor, and then going into a cold tank for twenty-four hours.

Mr. Grandage—Could that be applied to a roof already on?

Mr. Bascom—No. The creosote can be brushed on, but the sodium fluoride cannot.

Mr. Grandage—In the design of a new dyehouse, what is recognized now as the better installation for a process steam and power plant in connection with a dyehouse where a power plant and boiler plant only supply the dyehouse, where there is not an auxiliary plant tied in with the rest of the manufacturing? If you had a separate dyehouse to build and a power plant to connect with it, what would you use?

Mr. Bascom—You mean whether I would use low pressure or high pressure?

There is more kick to high pressure steam than there is to low pressure steam.

Mr. Grandage—I speak of that particularly from an economical standpoint.

Mr. Bascom—I don't think I can answer that offhand. Every installation has to be studied. If you can balance your load on your engine, it may be possible to use exhaust steam, or you may be able to put in a turbine and use bleeder steam. There are any number of ways that can be worked out. But you will not boil as rapidly with exhaust steam as you will with live steam. You will not dry as rapidly with exhaust steam as you will with live steam.

Mr. Grandage—Assuming you put in low pressure steam where back pressure steam was used from a turbine, what would the method be in establishing the cost of the steam? In other words, how much of that fuel would you charge to actual process steam and how much of it would you charge to power?

Mr. Bascom—That has to be decided at the plant.

Mr. Grandage—It is a question of balance of power between the engineer and the dyer—isn't that what it comes to?

Mr. Bascom—What we always hope for under those conditions is to get free power.

Mr. Grandage—The engineer hopes for free power. (Laughter.) The dyer is out of luck in that case.

Mr. Bascom—Yes, the dyer is out of luck. That should be divided between them, I think.

Mr. Grandage—In a perfectly balanced load you would split that half and half, wouldn't you?

Mr Bascom—I think so, without any question, because if you didn't have either one—that is, if you weren't using them in combination—each one would have to pay for his share, or be charged with his share.

Daniel P. Knowland—Which would you consider more efficient in a dyehouse, water tube or return tubular?

Mr. Bascom—We have always figured that for an ordinary plant a return tubular boiler was all right. If you are getting into power, if you are going to force the boiler, that is where the advantage of a water tube boiler comes in: you can get 100 or 150 or 200 per cent overload.

The load on the boile rcan be controlled to a certain extent.

By having your tubs coming in in rotation. On the other hand, it can also be cut down a great deal, if you can use hot water around the plant.

Mr. Knowland—I used to be a dyer in a mill and I had those conditions to contend with.

Mr. Bascom—Frankly, most of the installations that are made where only the dyehouse is being considered are return tubular.

Mr. Knowland—Personally, I don't like to work from a high pressure boiling dyehouse.

Mr. Bascom—Of course, you wouldn't attempt to run

150 pounds or 160 pounds in the dyehouse. There would be no particular object in doing that.

Mr. Knowland—Would coal consumption be the same?

Mr. Bascom—There wouldn't be much difference. Of course, if you had a large installation you could put in a very much better stoker installation under a water tube than you could under return tubular, although we have several stokers that are very good under return tubulars.

Mr. Knowland—Do you know of many dyehouses where they are running with returns from the kettle?

Mr. Bascom—No, the nearest approach to that is a system that they have tried out at Shawsheen, where they are trying to heat the water with steam arising from the kettle. That installation, they claim, is successful. It is very, very expensive. It costs about five to six thousand dollars for every four kettles. If you had a use for that hot water anywhere around the plant, it probably would pay for itself.

Mr. Grandage—What, Mr. Bascom, for a dyehouse with a saw-tooth room construction, metal sash on both sides and roof of the building, would be considered the better type of ventilating system to put in?

Mr. Bascom—It would depend altogether on what you were going to do.

Mr. Grandage—Cotton stock dyeing, open vat dyeing; it is a building approximately eighteen feet high with a saw-tooth roof; small hand dyeing boxes cover almost the entire floor space.

Mr. Bascom—You would have hoods to pick up the steam. How big are these particular tubs?

Mr. Grandage—Eight feet by three.

Mr. Bascom—Set how close together?

Mr. Grandage—Three and a half or four feet apart.

Mr. Bascom—You could have either a continuous hood over a row of those, or individual hoods for each one, but a continuous hood over a row would probably be the cheaper installation and would be very satisfactory.

Mr. Grandage—Wouldn't it be possible by the installation of enough exhaust fans in the base of the roof—

Mr. Bascom—It is perfectly possible to get rid of it without any hooding.

Mr. Grandage—But from an operating standpoint, that would be very much more expensive?

Mr. Bascom—Yes, very much more.

Mr. Grandage—What is the latest development in the coating of metal in the dyehouse, pipe metal fittings on the equipment?

Mr. Bascom—There is a special metal for piping for dyehouse work. I do not remember the name of it.

Mr. Grandage—In other words, your equipment originally is metal that doesn't corrode?

Mr. Bascom—Yes.

A. P. Howes—Have you had any experience with Monel metal for fittings?

Mr. Bascom—Monel metal is very satisfactory on the whole, also very expensive.

Mr. Howes—What I mean is, have you had enough experience to know whether the durability of the metal compensates for its initial cost?

Mr. Bascom—Yes, I think it would, from the experience that we have had on Monel metal.

Walter E. Hadley—In regard to your gypsum roofs, do you think they are going eventually to become saturated with moisture?

Mr. Bascom—If you have any amount of moisture in the air they will. Of course, the tendency has always been with gypsum for the moisture to get into the roof and then little flakes of gypsum will peel off and drop onto the floor.

Mr. Howes—Have you found any type of white paint that is reasonably resistant to the vapors in the dyehouse?

Mr. Bascom—We have tried out various so-called chemic and acid proof paints. We aren't advertising the various makers of paint but Wadsworth Howland have what they call a "brick and cement coat paint" that is quite satisfactory on concrete and brick work, and that will not peel off with moisture. Of course, the trouble with the ordinary paint on concrete or brick is that when moisture gets in the air, it simply flakes right off.

Chairman Lotte—Do you use double roof, with air space between, or just single?

Mr. Bascom—Ordinarily we use just the single, but we have insulation on top of that roof.

Chairman Lotte—Between the gravel?

Mr. Bascom—Yes; we have either cork or other material in between the plank and the tar and gravel.

Chairman Lotte—Do you consider that better than air space?

Mr. Bascom—Not necessarily, but the air space is rather expensive to build. Of course, the principal purpose of the air space in the past has been to keep away from dry rot. If the plank is properly treated you will not get dry rot. Hoxie's theory on that was: If you take a plank and put an air space above it and then a light sheathing with a roof on top of that, you will raise the dew point above the plank, and the top sheathing you put on would be creosoted, so that would not rot out; the plank would stand up all right. That theory is still good. I think it is just as well to start in at the very foundation and treat your plank, so that it will last.

Of course, this question of dry rot comes up continually. In the old days, when you got good lumber, it wasn't a serious problem, but to-day it is. We have had roofs dry rot that were up less than a year.

Chairman Lotte—We used double roofs, because we thought we would get less condensation.

Mr. Bascom—If you use cork, you will get the same effect.

Let us consider air as an insulating material. It is wonderful material, but when you get above an inch of air space you lose in the effect. You are losing gradually. Half an inch or three-quarters of an inch of air insulation is perfect, but if you get six inches it will not be nearly as good as that half inch. It sounds funny, but is true, as it works out.

Mr. Grandage—What would the installation of a cork roof mean, Mr. Bascom, or has that ever been tried? I mean a cork roof as the inside roof of a dyehouse.

Mr. Bascom—We would never put it on the inside. In the first place, it would dust. Cork, after it has been treated for roofing material, will dust off very easily. It must go on top. Of course, cork isn't the only insulation material. There are other insulation materials that we use a great deal and that are very much cheaper than cork.

Mr. Howes—What, for instance?

Mr. Bascom—We have used Celotex considerably. We have used Flaxlinum, but we never will again. If you get a puncture in your roof it will absorb the moisture very, very rapidly. That means that you have to take up a good sized piece of it.

Chairman Lotte—Have you found no concrete that will stand both alkali and acid?

Mr. Bascom—No. It is possible to treat concrete, to paint it with certain paints that will withstand the acid, but we have found that a dilute solution of acid is worse on it than the strong acid.

For instance, in a bleachery, in the sour bins we don't use concrete; we always use cypress. It is the same with the sour boxes; we always use cypress, while we use concrete for the chemic and for the ordinary wash boxes.

Mr. Howes—What has been your experience with temperature control apparatus, as far as justification of initial expense goes?

Mr. Bascom—I think it is worth it in most cases; that is, where you are using a great deal of steam. The only thing is to convince the dyer that it will do the work. You know that you go into many dyehouses and find they are not satisfied with the dyeing unless the liquor is boiling furiously and everything is bubbling up.

Mr. Grandage—Is it possible, Mr. Bascom, in the construction of vats inside of a plant that are used for dissolving purposes, where the temperature is apt to vary considerably (from, say, a temperature of 30 or 35 in the coldest weather, when water is at lowest temperature, to 150), to build those vats of concrete– reinforced concrete—so that they will withstand the contraction and expansion?

Mr. Bascom—It is possible, if they are not too large.

Mr. Grandage—That calls for reinforcement?

Mr. Bascom—Yes; it has to be reinforced on the surface. Reinforcement is carried out on the surface more than it would be under ordinary conditions.

Mr. Grandage—Has any real progress been made that you know of for lining dye vessels of any kind with concrete or with any mixture similar to concrete?

Mr. Bascom—No; it has been done as far as mixing kettles are concerned, to a certain extent. You can take a wooden tank and put little strips of wood around it and line it with concrete, but as far as the kettles themselves are concerned I don't know of anybody that has done it.

Chairman Lotte—Did I understand you to say that where the roof was ventilated by natural exhaust, you cleared the room?

Mr. Bascom—You refer to the one that had no hoods over the dye tubs, and a special natural ventilator?

Chairman Lotte—Yes.

Mr. Bascom—There was warm air blowing up along that roof. In that particular case the ducts were discharging to the floor and also along the ceiling, so that we created a draft along the ceiling which carried out the steam and at the same time kept that roof warm and cut down condensation.

I may say that in the first installation of that type that we made we ran into a snag. It was built during the war, when wood was almost impossible to get—durable wood—and we put in concrete beams. They were spanning 40 feet. That meant they were over 4 feet deep. We provided for warm air currents along the roof, all right, but we didn't figure that our beams were going to stay cold all day long, with the result that we did get some condensation off the bottom of those beams; in spite of the fact that the room was warm the concrete beams never got up to room temperature, and there is where the difficulty that we had came in: on the condensation of those beams. The ceiling was all right.

Chairman Lotte—Then, you don't consider concrete very good for dyehouses at all?

Mr. Bascom—I don't consider, on a one-story building, that concrete roofing is the right thing to put on, because it would be almost impossible to keep condensation off altogether. On a multi-story building it is perfectly satisfactory, because if we can get a flat ceiling we can blow the warm air currents along the surface and cut down the condensation. For instance, the first one I showed you was a four-story building. That was on raw stock dyeing of cotton, vacuum machines. Of course, they are not steam producers, in the way that Delahunty machines are; but that ceiling has nothing but warm air currents on it, and we depend altogether on those natural drafts; they are not absolutely natural, because we have ventilators at the top, but there are no fans on the exhaust. But it makes a difference whether you have a

warm roof over it or whether you are up against the outside air.

Chairman Lotte—Do you ever, in drawing in hot air, have any trouble with spotting of goods or anything like that?

Mr. Bascom—No. As a matter of fact, I went into that in a very large installation that we are just making in the West (this is not a dyeing plant altogether; it is shade cloth), where they are filling very largely with very heavy filling. The plant is located right in the heart of the city, where it is very dirty and very sooty. They use all soft coal out in Chicago. We are arranging to wash all the air that goes into that building.

Mr. Howes—How do you wash it?

Mr. Bascom—By water sprays coming down over the plates. The air is drawn through these. Then, of course, it is heated as it goes into the building. In that particular building I refer to we are handling something like four hundred and fifty thousand cubic feet of air per minute, I think.

Chairman Lotte—Does the hot air have any effect on the matter of health?

Mr. Bascom—That is a good point. The nozzles must be so arranged that you won't be getting a strong draft on the operators. We have changed those at various times. Most of those that you saw had deflectors on them so that the air wouldn't come down directly onto the operators. We have changed the construction of that nozzle recently so that it is perforated all over the bottom, and it breaks up the air current so that there is no draft.

Chairman Lotte—I understand that in some cases the health department complained on that score.

Mr. Bascom—Yes, they have complained, where the operators get that draft. Of course, ordinarily we try to arrange it so that the air won't come right into a working space—that is, where a man is working; it comes into the working space, but not on the man. On the other hand, in the South and places like that a good ventilation system will make the conditions very much more bearable than they are otherwise.

In the new Pacific plant (of course, that is way down in the Carolinas) we have a tenter room that is just as comfortable in the middle of summer as it is in the winter, and that is saying a great deal.

Chairman Lotte—Do you cool the air in that case?

Mr. Bascom—We are doing two things there: We have tenter houses that are well insulated, and in the same room with those we have a lot of driers which are well hooded; that is, we have partitions that come way down to the floor, with just a little air space at the bottom. We are also cooling the goods as they leave the dry kilns.

Chairman Lotte—Do you cool them by air?

Mr. Bascom—Yes, by air.

Chairman Lotte—Then you cool the air?

Mr. Bascom—We just take outside air. Air circulated is always a great deal cooler; it seems cooler and it does cool. When you take a hot piece of goods and blow on it, it does cool off the room temperature.

The purpose of doing that, of course, is to give a cool working space, so that the operator will be perfectly happy and satisfied.

Chairman Lotte—Are there any other questions you would like to ask Mr. Bascom? We seem to have sort of monopolized this discussion. The meeting is open to everybody. We want everybody to ask questions. In fact, your asking questions may help somebody else to think of some that they would like to ask.

I am sure we enjoyed this talk by Mr. Bascom, and I am sure it made those of us who are in dyehouses and who have help to contend with appreciate just what it means. If Mr. Bascom has succeeded in making those people down in North Carolina happy, I hope he is successful in making some of our people up here happy. We are not always successful in doing that.

If there are no further questions I will be glad to entertain a motion to thank Mr. Bascom.

. . . It was regularly moved, seconded and voted that Mr. Bascom be extended a rising vote of thanks. (Applause.)

The meeting adjourned at 9.20 p. m.

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Dye Division — American Chemical Society

ABSTRACTS OF PAPERS PRESENTED AT BALTIMORE MEETING, APRIL, 1925

The Secretary of the Division, O. E. Roberts, Jr., Smithsonian Institution, Washington, D. C., will be glad to receive any corrections or comments on the following:

Ethyl and Diethyl-Benzenes

E. L. Cline, J. E. Copenhaver and E. Emmet Reid

The preparation of these hydrocarbons has been improved so that they are now readily available at low cost. A study of their similarities and dissimilarities to toluene and the xylenes is being made. An efficient separation of ortho and para nitroethylbenzenes has been devised. The amino-ethyl-benzenes have been prepared and put through a variety of reactions. Dyes have been made so as to show the effects of ethyl groups in various positions.

A Further Study of the Action of Sulphur Upon P-Toluidine

M. T. Bogert and L. Smidth

A new method has been worked out for separating the various products which result from the fusion of p-toluidine with sulphur in the presence of litharge. Isomers of dehydrothio-p-toluidine have been prepared carrying the amino group in the ortho and meta positions on the 2-phenyl nucleus. The sodium sulphonate of the latter has been oxidized to a dye of Chloramine Yellow NN (Colour Index No. 814) type, whereas the ortho isomer failed to yield a similar product. The amino groups of thio-p-toluidine have been replaced by halogens, and the sulphides oxidized to sulphoxides and sulphones. Other new derivatives of thio-p-toluidine and of dithio-p-toluidine have been prepared and investigated.

Some New Dye Intermediates

M. T. Bogert and R. L. Evans

2, 4-dinitrochlorobenzene reacts readily with phenolic salts to give 2, 4-dinitrophenyl aryl ethers. These dinitro ethers are easily reduced to the corresponding nitroamino and diamino diaryl ethers, which may also be described as aryloxy derivatives of meta-phenylenediamine and of meta-aminophenol. From these intermediates dyestuffs are produced by the usual methods. By employing thiophenols in place of phenols, analogous intermediates are obtained, namely, the nitroamino and diamino diarylthioethers, which can be used in much the same way and show similar properties.

The Synthesis of Another Isomer of Dehydrothio-P-Toluidine: 2-(P-Amino Phenyl)-5-Methyl-Benzothiazole

M. T. Bogert and R. W. Allen

The synthesis comprised the following steps: 3-nitro-4-amino toluene-3-nitro-4-iodo-toluene-bis (2-nitro-4-methylphenyl mercaptan-2-(p-nitrophenyl)-5-methyl-benzothiazole - 2 - (p-amino-phenyl)-5-methyl-benzothiazole. Oxidation of the sodium sulphonate of the latter with hypochlorites, yielded a dye analogous to Chloramine Yellow NN (Colour Index No. 814).

Testing Fastness to Light with the Incandescent Lamp

Wm. D. Appel

Preliminary experiments indicate that the light from the gas-filled tungsten incandescent lamp screened with a solution of copper sulphate very nearly duplicates the effect of sunlight on dyed fabrics and is better than other artificial sources in this respect. The apparatus used in these experiments is described and some results obtained by exposing samples under conditions of high and low humidity are given.

Fastness to Washing Tests for Dyed Textiles

Wm. D. Appel and I. M. Welch

The problems involved in the development of standard fastness to washing tests are discussed and results of some experimental work are reported.

Strength of Commercial Dyes

Wm. D. Appel

Relative strength determinations on samples of some fourteen dyes from domestic and foreign sources indicate that certain strengths for some of the dyes are adhered to rather consistently in the industry. The desirability of establishing trade standards for strength of dyes is pointed out.

Standardization of Agalma Black 10B

Wm. D. Appel, Wallace R. Brode and I. M. Welch

A series of samples of Agalma Black 10B from foreign and domestic manufacturers has been evaluated independently by means of titanous chloride titration, spectrophotomethic measurements, and practical dyeings. The possibility of writing specifications for and establishing one or more trade standards for the dye is discussed.

A Comparative Study of Azo Dyes with H-Acid and Acetyl-H-Acid

William Wright Lewers with Alexander Lowy

A comparative study was made of azo dyes prepared by the use of H-acid and acetyl-H-acid, respectively, as passive components. Thirty-three new azo dyes having acetyl-H-acid as the passive component were prepared and studied. The thirty-three analogous dyes of the H-acid series were prepared to furnish a basis of comparison. It has been shown that the introduction of an acetyl group in H-acid shifts the color of the dye toward the red. The dyes prepared were shown to have in general a good exhaust on wool. A new method for the diazotization of beta-aminoanthraquinone has been carried out.

Analysis of Acetic Anhydride

W. S. Calcott, F. L. English and O. C. Wilbur

The usual method of determining the purity of acetic anhydride is unreliable because of the error introduced through the assumption that acetic acid is the only impurity in the anhydride. It also seems probably that there is a side-reaction in the hydrolysis that gives low results for the anhydride. The methods in which the acetylation value is determined with aniline are subject to an error due to the reaction of the aniline with the acetic acid present in the anhydride. The method of J. H. Walton and L. L. Withrow for acetic acid in acetic anhydride is only readily applicable to samples containing 5 per cent or less of the acid, and, as the anhydride is taken as the difference, an error is introduced due to impurities other than acetic acid in the anhydride. The method of Orton for estimation of small amounts of acetic anhydride in glacial acetic acid is adaptable to the determination of acetic anhydride. However, the procedure is lengthy and involves several chloroform extractions which make it undesirable for routine use. In addition, the 2:4 dichloroacetanilide is converted to the corresponding chloroamine, which is unstable, decomposing rapidly in direct sunlight, so that rapid handling is necessary to avoid errors due to its decomposition. A modification of the latter method has been developed which overcomes these difficulties. By this procedure the acetic anhydride is determined by amidation with 2:4 dichloraniline dissolved in glacial acetic acid, and titration of the excess of dichloraniline with sodium nitrite in the presence of the acetanilide formed. This method has been applied to a sample of anhydride containing 0.3 per cent acetic acid. The anhydride contents were found to average 98.9 per cent.

Naphthalene Sulphonic Acids. VII. The Hydrolysis of Naphthalene-1, 6 Disulphonic Acid

J. A. Ambler and John T. Scanlan

Free naphthalene-1, 6-disulphonic acid was prepared and purified by known methods. The hydrolysis was carried out in sealed glass tubes using sulphuric acid of strengths varying from 1 per cent to 77 per cent and at temperatures ranging from 160 to 230 deg. Cent. The degree of hydrolysis was determined by measuring the increase in acidity. It was found that naphthalene-1, 6-disulphonic acid is converted by hydrolysis directly to naphthalene and H_2SO_4, the reaction going to completion where the concentration of H_2SO_4 is low, but at concentrations above approximately 72 per cent H_2SO_4 analysis indicated that hydrolysis and resulphonation had completely converted the original acid to the 2, 6 and 2, 7 isomers. Analysis failed to reveal the presence of beta-sulphonic acid at all concentrations of H_2SO_4 used. No free naphthalene was obtained where the concentration of H_2SO_4 was 72 per cent or higher. The effect of variation of the temperature upon the degree of hydrolysis was also studied.

Studies in Vapor Pressures—The Nitranilines

J. F. T. Berliner and O. E. May

In the compilation of the physical constants of dyestuff intermediates it has been found that for many of these vapor pressure determinations have never been made. Study of vapor pressures is of fundamental, practical and scientific importance, since from these many important properties, constitutional and otherwise, may be derived, among which are the amount and rate of decomposition at any given temperature or pressure latent heat of vaporization, entropy, polarity, critical temperature, etc. It also offers the most accurate method for the determination of boiling points. This preliminary paper deals with the vapor pressures of the nitranilines, determined by the dynamic method.

The Dependence of the Color of Technical Dyes Upon Hydrogen Ion Concentration

W. C. Holmes and J. F. T. Berliner

The characteristic behaviors of a comprehensive selection of red and violet basic dyes with alteration in hydrogen ion concentration over an extended range are tabulated and the utility of the tablets in various connections are discussed.

The Spectrophotometric Determination of Hydrogen Ions and of the Apparent Dissociation Constants of Indicators. IV. 1-Naphthol-2-Sodium Sulphonate Indophenol

W. C. Holmes and E. F. Snyder

The dissociation of the indicator is discussed and data supplied for its application in the determination of hydrogen ion concentrations.

The Titration of Dye Mixtures by Means of Titanous Chloride

Walter C. Holmes

1. Under suitable conditions quinonimide derivatives and many azo dyes may be titrated in the presence of phthalein dyes. 2. The dyes of the first group may also probably be titrated in the presence of triphenylmethane derivatives, although the preliminary trials have not invariably been completely successful. 3. Triphenylmethane derivatives may be titrated in the presence of phthaleins. 4. The independent titration of component dyes in a mixture of quinonimide derivatives is often practicable. 5. Promising results have been obtained in the analysis of a mixture of azo dyes of different type. 6. In some instances an approximately accurate calculation of the percentage of dyes in mixtures may be based upon their total consumption of titanous chloride and an independent value for total dye content by difference.

Unsymmetrical Thioindigo Dyes

A. Willard Joyce

A review of the literature on the preparation of Thioindigo dyes shows that the Thioindigo derivatives which have been described are, almost without exception, symmetrical in constitution; that is, both benzene rings, when

substituted, contain the substituting group in the same relative position in each ring. Many representatives of these derivatives have found commercial use. It is my purpose to investigate the tinctorial value of some Thioindigo derivatives which are unsymmetrical in constitution. Since the position of substituting groups affects the shade, it is possible to obtain intermediate shades between the shades of symmetrically constituted dyes produced from the same intermediates. A number of unsymmetrical derivatives of Thioindigo are now under examination.

Organic Sales of Eosine

Irving W. Fay and Bernard S. Kline

Several years ago the aniline salt of Congo red was found to be white yielding a blue color with acids and a red color with alkalies. Wishing to find if there would form such a possible organic salt of eosine which should be white, the aniline salt was prepared by boiling alcoholic eosine with aniline. The aniline salt was not white but retained the color of eosine. Then p-nitroaniline, m-nitroaniline, diphenylamine and benzidene salts were made. None showed white but lighter or darker shades of eosine and showed bronze green reflexes on evaporating to dryness. The benzidene salt, unlike the others, has the peculiarity of not melting at any temperature but slowly charring. These salts will be used to color collodion to find if they may form a fluorescent varnish.

Highs and Lows in a Busy Chemist's Life—Part III

Freezing Water from Wool—Effect Threads—Absorption of Knowledge—The Comics of Chemistry

NOT only the men in the mill get strange ideas. The general manager had seen water drops on something that was in cold storage and got the idea that the water was being frozen out. Why not freeze the water out of cloth? Nothing would do but that it must be tried. Saying that it wouldn't work had no influence. "Try it."

Some coils were enclosed in a small room and properly connected with the ammonia plant, and they were soon covered with frost. A wet swatch of woolen cloth was weighed and hung among the coils to "dry." It was weighed from time to time until it had gained another 40 per cent of water when the experiment was discontinued as being unsuccessful. The cloth not only failed to dry, but it got so cold that it condensed water just like the cold pipes and collected it from the air that slowly circulated by convection through the coils. It was laughable to see the sober-faced mill executives so carefully arranging this important experiment, when they all knew it was a waste of time and wanted to be back on their jobs.

One day the superintendent of the woolen mill thought he "had something" on the dyer, and to all appearances he wanted to "get something" on him. He personally came from another mill to the laboratory with a piece of woolen that was supposed to have white silk effects. Probably they were artificial silk. At any rate, they did not show and he wanted to see if they could be cleared. I couldn't see any silk at all, until finally I found something where a thread was supposed to be. On splitting the piece along the line of one of the effect threads I found inside tiny bits of white silk, but on the surface not any of any color. It was not the dyer this time. The effect threads had all rubbed off in fulling.

Some big executives are hard to understand. They will build a new mill and never go near it from start to finish, but if someone with a foreign accent, and a personality to go with it, comes along with a wonderful new bleach, they will stick around the place all the afternoon watching him perform.

There must be a technique in the psychology of executiving that chemists cannot understand, for everybody knows that the big fellows look only after the big things in business. I do not know how to reconcile this with the facts that the new mill becomes a successful business while the new bleach is usually never adopted.

The chemist who does not try to absorb all available knowledge about mill methods and machinery as early as possible in his career makes a great mistake. The attitude in the mill seems to be that if he does not know all about these things he cannot be of any use outside the laboratory, and there is a large measure of truth in that idea.

Anybody can see that certain parts of a loom move back and forth and see what they do without knowing the names of them, but if you tried to talk sizing, for instance, with the boss weaver and couldn't properly designate them he would at once say, "What does he know about weaving?" (and therefore, about anything else?)

These same foremen will declare almost on oath (for I have heard them do it) that a piece of lime will evaporate; that the Twaddle of sulphuric acid is low because it has settled out from the solution; or that a few pints of ammonia cleared up a solution containing aluminum; or remark of the C. P. sodium chloride, that it doesn't *taste* any stronger than *ordinary* salt. But, they turn out production day after day, in a profitable way, and that is what the mill is running for.

The workmen in the mill do their share of stunts, too, through ignorance or carelessness. It is hard to say which it was in the case of the man who carried oil of vitriol in a wooden bucket until the bottom fell out and let it go all over his feet. Perhaps this is evidence of the need of more chemistry in that particular plant.

In another instance, soda was used in the last rinse when dyeing benzopurpurine, so that it could be dried into the goods. The workman put the soda in according to instructions, and then washed it out again on his own responsibility. Fortunately the shade changed

and was caught before the goods got out of the mill.

Nor are these stunts all confined to the mill.

A salesman, who was at the same time one of the owners, did not know that his own "nitrate of iron" was not a nitrate, but a basic sulphate.

An enterprising chemical dealer, desiring to follow the then new fashion of selling analyzed chemicals for laboratory reagent use offered this gem, copied right from his label for ammonium nitrate:

NH_4	32.54%
N	17.53%
O	59.92%
	99.99%

The label did not state how this valuable result was obtained, but it was strongly reminiscent of the so-called "dry analyses" that were sometimes perpetrated in quantitative lab.

And now we come again to the chemist himself. One day I visited a laboratory at a plant for the experimental manufacture of artificial silk, and found two Ph.D.'s, and a couple of ordinary chemists experimenting with dyes. Among other things they had a 7 per cent solution of an "artificial silk black" and a large dye bath at that, which was their interpretation of the dye manufacturer's 7 per cent shade. They concluded that the silk took the dye in a satisfactory manner. It certainly ought to if it would under any conditions at all.

One day in my absence, a dyer and his assistant found occasion to test a dyed sample to see if it was sulphur black. They apparently went through all the motions, and got a negative result. Then they tried the same test on a sample that had just been dyed sulphur black, and got a negative result for that. The final conclusion was that the unknown sample was not sulphur black, and it was based entirely on this test, without any other for confirmation. To make this short story still shorter, the dye *was* sulphur black, in spite of their original style of reasoning, for it gave a beautiful reaction when the test was properly carried out.

Chemists will not need, and probably dyers will not heed, a moral.

Dyestuff Tables

A List of the Principal American-Made Colors with Their Properties and Fastness Characteristics

[NOTE: The publishers of The REPORTER have secured more or less complete data in regard to many of the dyestuffs which are at the present time being manufactured in the United States. As the following material has been brought together from various sources, they realize that errors are quite likely to appear, and it is earnestly requested that any readers who find errors or who are able to give additional information will communicate with the publishers in order that this material may be made as correct, complete and up to date as possible. These tables will appear serially until all colors upon which we have data shall have been covered. The publication of this data was begun in the issue of March 10, 1924.]

DIRECT BRILLIANT BLUE G

(Schultz No. 415)

COMPOSITION: Disazo.

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: Common salt.

SHADE: Trifle redder than Benzo Sky Blue (S-426).

SHADE BY GASLIGHT: Duller.

SOLUBILITY: Good.

LEVEL: Good.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Good to acetic and sulphuric.
Alkali: Not changed by ammonia.
Chlorine: Destroyed.
Ironing: Duller.
Light: Same as S-426.
Perspiration: Fast.
Rubbing: Fast.
Washing: Moderate.

DYED BY OTHER METHODS: The shade cannot be dyed and developed. After-treated with copper, it turns redder and duller, but is not rendered faster to water or washing.

ON UNIONS: On half-wool: The wool is only very slightly stained. On half-silk (dyed with soap): The silk is left almost white. In a neutral common salt bath the silk is dyed a full shade.

COMPETING PRODUCTS: Made in the United States by Newport Chemical Works, under the name of Direct Brilliant Blue G.

CHICAGO BLUE RW

(Schultz No. 419)

COMPOSITION: Disazo.

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: With salt and soda ash. For light shades omit salt and use soda ash and soap or soluble oil ½ to 1 per cent.

SHADE: Bright medium shade of blue.

SHADE BY GASLIGHT: Redder.

SOLUBILITY: Good.

LEVEL: Dyes level.

FASTNESS TO:
Acid: Very fast.
Alkali: Moderate dyed direct.
Boiling: Loses badly.
Light: Dyed direct, very moderate; after-coppered, much better.
Rubbing: Fast.
Washing: Dyed direct, moderate; after-coppered, much better; coppered and chromed, still faster.

DYED BY OTHER METHODS: When after coppered and chromed, the shade is duller and greener than the direct dyeing.

ON UNIONS: Cotton-wool unions: Dyed in a neutral salt bath, the cotton is slightly heavier than the wool; the wool is redder in shade than the cotton. Cotton-silk unions: Dyed with soda ash and soap, the cotton is heavier than the silk and the silk is redder.

DISCHARGING: When after-treated, the shade discharges white with hydrosulphite.

COMPETING PRODUCTS: Made in the United States by American Aniline Products, Inc., under the name of Amanil Blue RW; Newport Chemical Works, under the name of Direct Fast Blue RW; E. I. du Pont de Nemours & Co., under the name of Pontamine Blue RW; National Aniline & Chemical Company, under the name of National Niagara Blue RW; Cincinnati Chemical Works, under the name of Chicago Blue RW (Selling Agents, Ciba Company, Sandoz Chemical Works, and Geigy Company).

NIAGARA BLUE R

(Schultz No. 421)

COMPOSITION: Disazo.

SPECIALLY SUITABLE FOR: Cotton and wool.

USUAL METHOD OF DYEING: On cotton, with salt at the boil. On wool, with Glauber salt and acetic acid. (Shade is redder and slaty in strong acid bath.)

SHADE: Navy blue.

SHADE BY GASLIGHT: Redder.

SOLUBILITY: Fair.

LEVEL: Fair.

FASTNESS TO (on Cotton):
Acid: No change with acetic.
Alkali: Fast.
Chlorine: Fugitive.
Ironing: Temporarily redder.
Light: Good when after-treated.
Rubbing: Fast.
Sulphur: Good.
Washing: Poorer than average; goes redder.

FASTNESS TO (on Wool):
Acid: Strong acid turns shade violet.
Alkali: Lime or soda duller.
Fulling: Stains white cotton, not wool.
Ironing: Same as on cotton.
Light: Good.
Perspiration: Fast.
Rubbing: Crocks slightly.
Steaming: Greener and duller.
Street Dirt: Fast.
Sulphur: Good.
Washing: Average.

SENSITIVE TO METALS, LIME: Copper makes the dyeings lighter, dulls the shade and throws it redder.

OTHER PROPERTIES: Not suitable for cops.

DYED BY OTHER METHODS: After-chromed: Duller and no faster, except to light. After-coppered: Duller and no faster. Developed with beta-naphthol, duller and redder; with Developer B, greener and duller, faster to washing; with Developer R, redder and duller, faster to washing.

ON UNIONS: Cotton-wool unions: Cotton well dyed; wool much redder and lighter. Cotton-silk: With soap and soda the silk is only slightly stained.

ON OTHER MATERIALS: Silk: Affinity poor; fast to water against wool, but not against silk or cotton. Paper: Not suitable. Jute, Linen, Ramie: All dyed with salt.

PRINTING: Not suitable.

DISCHARGING: On cotton: With tin, cream shade; with zinc, white; with hydrosulphite, white. On wool: Tin, a cream; zinc, white.

COMPETING PRODUCTS: Made in the United States by National Aniline & Chemical Company, under the name of Niagara Blue R.

CHICAGO BLUE 6B

(Schultz No. 424)

COMPOSITION: Disazo.

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: With salt at the boil.

SHADE: Greenest and brightest of the substantive blues.

SHADE BY GASLIGHT: No change.

SOLUBILITY: Good.

LEVEL: Dyes level.

FASTNESS TO:
Acid: Fast.
Alkali: Fast against ammonia; moderate against soda.
Chlorine: Destroyed.
Cross-Dyeing: Will not stand cross-dyeing.
Ironing: Fast.
Light: Dyed direct, very moderate. After-treated with copper, excellent.
Steaming: Fast.
Washing: Fair in light percentage.

MACHINE DYEING: Suitable.

DYED BY OTHER METHODS: Dyes cold fairly well. Topped with hydrosulphite of soda: The light fastness is improved. Topped with zinc sulphate: The light fastness is no better. Topped with copper sulphate: Very fast to light; the shade is much greener and the fastness to washing is better; the shade washes reddish but tints cotton less. Topped with nickel sulphate: No change in shade; no faster to washing; somewhat faster to light, but not as fast as with copper sulphate.

(Continued on page 278)

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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CARELESS AND HARMFUL PUBLICITY

FROM the Baltimore meeting of the American Chemical Society there emanated some of the most misleading and harmful publicity regarding the American dye industry which it has recently been our misfortune to observe in the American press.

R. Norris Shreve, Chairman of the Section of Dye Chemistry, in speaking about the accomplishments of American dye chemists, made statements which were variously and erroneously reported, and which were given wide attention in both news stories and editorials. It is true that the news service of the American Chemical Soicety has since issued a statement saying that Mr. Shreve was misquoted. The harm, however, has been done, and whether the blame for the misstatements rests upon Mr. Shreve or upon the reporting organization of the American Chemical Society matters little. The fact that the trade and consumer press gave the remarks wide publicity dealt the American industry a blow far more effective than the most subtle of German propaganda.

To use the words of one contemporary, Mr. Shreve declared, "fadeless vat dyes are now being produced in the United States at prices below their cost in Germany." Another source had it that "vat dyes . . . are actually being exported to Germany."

The above quotations and many of similar character were attributed to Mr. Shreve in connection with his eulogy of the work of H. D. Gibbs and C. Conover, chemists in the color laboratory of the Bureau of Chemistry of the Department of Agriculture, in perfecting a process for the cheap production of synthetic phthalic anhydride and aluminum chloride as a basis for the manufacture of anthraquinone, the chief intermediate used in the production of vat dyestuffs.

Mr. Shreve's tribute to these chemists is, undoubtedly, well deserved. His reported remarks, however, relative to the extreme cheapness of production of vat colors by American manufacturers and the consequent inference that these manufacturers must be reaping a financial harvest through the sale of vat colors at prices which, as is well known, are still far above pre-war levels, is the grossest misstatement of fact and the most harmful variety of stupid publicity which can well be imagined. How some of our esteemed contemporaries, who are supposed—theoretically at least—to know something about the status of dyestuff manufacture in America, could have passed these statements without question is beyond our comprehension.

As a matter of fact, we doubt sincerely whether any American manufacturer of vat dyes is yet able to show a profit on his entire operations covering the production of this class of colors. The amounts expended in initial research and plant construction by the two principal producers of vat colors in this country before a single pound was placed upon the market were, to our actual knowledge, overwhelmingly great. And even after commercial production was begun, seemingly insurmountable difficulties entailing great expenditures were encountered at every angle, and it is only in the recent past that these concerns have been able to show any manufacturing profit at all. Even to-day many of the colors are still produced at a loss.

The harmful effect upon consumers of vat colors who read and accepted as true the statements attributed to Mr. Shreve cannot be exaggerated. The demoralized condition of prices in the domestic dyestuff market has been the subject of frequent editorial comment in these columns and, in our opinion, to-day constitutes the most serious menace to the continuance of our dyestuff manufacturing industry. How utterly hurtful it is, therefore, to give consumers the impression that they are paying inflated prices for vat dyestuffs when, as a matter of fact, it will be a long time before producers of these colors have even received back their original investment. We sincerely trust that the trade and general press will devote as much attention to the retraction as it did to the garbled accounts of Mr. Shreve's original remarks.

SENATOR BORAH TALKS ON ALIEN PROPERTY

SCARCELY had elation over the Chemical Foundation's victory in the U. S. Circuit Court of Appeals subsided when Senator Borah, in a speech condemning the World Court and other things, made a short but impassioned plea for the return of German property held by the Alien Property Custodian. Mr. Borah reminded his audience of the deep moral obligation which certain foreign treaties place upon the United States Government in its relations with the owners of alien property seized during the war. This very question of treaties was involved in the Chemical Foundation suit; and in the final decision of the court it was explained that by the Treaty of Berlin Germany gave to the United States the benefits of the Versailles Treaty in which Germany agreed to settle the claims resulting from alien property seizures here, and agreed to allot the property itself to the discharge of awards against her by the German-American Mixed

Claims Commission. That seems to clear away any "moral obligations" involved; and unfortunately for Mr. Borah it suggests illogicalities in his opinions on the subject.

It is very probable that Senator Borah did not have in mind the particular property which the Chemical Foundation has been fighting so long and so hard to retain; nor, on the other hand, is it at all probable that he was mentally excepting the dye and chemical patents, mentally setting them aside from the other alien property he advocates returning. How reassured we should be in our Government and its representatives if there were any reason to assume that in his plea the Senator *was* excepting the patents.

But no, Mr. Borah is at least consistent in his inconsistencies. In this respect he strangely reminds us of those who engineered the Government's suit against the Chemical Foundation, those incomprehensible persons who constructed its elaborate case teeming with inconsistencies, those whom four learned judges strove in vain to convince of the extraordinary importance to this country of a self-contained chemical industry—an industry which they stubbornly attempted to emasculate—an industry of which they and our Government, and its Senators, too, ought to be proud—an industry which should command every possible protection. But how do they regard it? No sooner is one body vanquished in its legal battle to recover the patents, than one of our Senators rises with a plea which, if heeded, would serve to vindicate and to support a suit which has been dismissed from two courts as utterly devoid of legal weight, and serve to nullify the efforts that our chemical industry has made to retain the foundation upon which it heavily depends for its existence.

Might we not earnestly suggest that should the Government appeal its suit against the Chemical Foundation to the Supreme Court, it seriously consider annexing to its staff of attorneys, as a sort of after-dinner speaker in an advisory capacity, this Senator who believes as it believes and who can express his beliefs with such specious logic?

OXALIC ACID REPORT

The United States Tariff Commission has published its report on the investigation of the costs of production of oxalic acid in the United States and in the principal foreign competing countries. The report covers the history of the investigation, uses and manufacture of oxalic acid, production, consumption, prices and similar information of value to domestic manufacturers.

At Portland, Oreg., the Columbia Knitting Mills Company has leased the four-story and basement structure, at the northwest corner of First and Salmon Streets, according to an announcement just made, and will occupy the entire building with its manufacturing plant. Alterations and new equipment will involve an expenditure of approximately $50,000.

CORRESPONDENCE

CREDIT WHERE CREDIT IS DUE

Editor, AMERICAN DYESTUFF REPORTER:

Pride in our domestic chemical industry is laudable and, in fact, greatly to be desired, but an excess of zeal to rush into print on a subject where the speaker or writer is uninformed is helpful to no one and harmful to many.

The men in the color laboratory of the Department of Agriculture have undoubtedly done good work, and work also which is contributory to the success of American dye making, but to credit to them the successful manufacture of vat dyes in America or the making of American textile mills independent in the field of fast dyes is a gross misrepresentation of fact.

A source of anthraquinone of good quality is an absolute essential, but having the anthraquinone still leaves one a goodly distance to go to obtain the complex compounds that are the finished vat dyes used by the textile manufacturers.

The manufacturers of this class of colors in America have spent vast sums in perfecting processes and in discovering and developing new ones. Much of the work of accomplishment obviously can never be accurately credited to this or that particular chemist, but just the same very great credit is due and should be given to the chemists in the several organizations who for a number of years have been busily engaged in the actual day-to-day work which has made the present measure of success possible. While they are far too busy to present papers themselves or in many cases even to afford the time necessary for attendance at the American Chemical Society meetings, they nevertheless cannot feel very flattered to see someone, really an outsider as far as this group of products is concerned, get up and blithely hand over the credit for all their years of work to someone else.

Personally, I can't quite see the occasion anyway; for if my information is correct, the accomplishments of the color laboratory are not new but are something now several years old.

Another evil of carelessness or looseness in reporting is the ever-present tendency of the press in general to draw from the reports such lessons or interpretations as best suit their particular local clientele. Thus we have an editorial in the Boston Herald of April 8, of which the following is a choice part:

> "The American household is thus benefiting greatly from what are called 'the cheaper intermediates for dye manufacture,' and *the American makers of them are said to have already realized savings aggregating millions of dollars.*"

If only this were true everybody would be happy.

Yours very truly,

ELVIN H. KILLHEFFER,
Vice-President, Newport Chemical Works, Inc.

NEW METZ COMPANY

The General Dyestuff Corporation filed incorporation papers at Albany recently, the incorporators' names being given as Herman A. Metz, Almuth C. Vandiver and A. A. Vantine. The latter two are attorneys at 37 Wall Street, New York City. Although Colonel Metz was in Bermuda at the time and no statement could be obtained from him, it is taken for granted that this corporation is in line with the policy which he outlined to The Reporter some time ago, by virtue of which the two manufacturing companies which he controls—Consolidated Color & Chemical Company and Central Dyestuff & Chemical Company —will be amalgamated into one concern together with H. A. Metz & Co., Inc., the present selling organization. It is possible that further units will be added to this amalgamation, but no official statement along this line is expected in the immediate future.

NEW DU PONT COMPANY TO HANDLE EVERDUR METAL

Du Pont Everdur Company has been organized to take over the manufacture and sale of the metal alloy known as Everdur No. 50, heretofore handled by the Du Pont Engineering Company.

This corrosion resistant metal is a discovery made by Du Pont chemists in their search for an alloy to meet the requirements of the company's many chemical activities. The use of acids and chemicals, particularly hydrochloric acid, presented many problems which the metals heretofore available for the construction of plant equipment did not meet. As a result of a number of experiments a copper silicon alloy was produced which was found to be highly resistant, not only to hydrochloric acid, but to a large number of other corroding liquids. It has a tensile strength above the acid resistant bronzes, makes sound castings, is easily machined and has been found to be available for a great number of purposes. It can be fabricated into practically all forms obtainable from steel, including cold drawn seamless tubing.

The new company, which will operate as a subsidiary of the Du Pont Company, will manufacture the metal at Wilmington, Del.

"Comparative Wearing Qualities of Pima and Ordinary Cotton Used in Mail Bags," No. 277 of the Technologic Papers of the Bureau of Standards, has recently been issued by the Bureau. The booklet deals with the general characteristics of Pima cotton and its various uses, describes in detail the procedure of the test and manufacturing methods and gives the results and conclusions of the investigation.

THE KNITTING ARTS EXHIBITION

During the week of April 6th the twenty-first annual Knitting Arts Exhibition attracted a record crowd of visitors to the Commercial Museum in Philadelphia. The exhibition this year was the most successful from every standpoint in the history of the knit goods industry. It was held under the auspices of the National Association of Hosiery and Underwear Manufacturers, under the general supervision of its National Secretary, John Nash McCullough, and under the personal direction of Chester I. Campbell. Both of these men deserve unlimited credit for the success of the exhibition.

Over 300 booths covered the expansive floor of the Commercial Museum, the large armory-like building where the exhibition is held every year. The exhibits comprised knitting machinery and parts, textile materials and chemical processes related to the knitting industry. Most of the machinery was displayed in full operation, knitting sweaters and hosiery, winding yarn, sewing, looping, dyeing, washing and pressing. This moving machinery added a distinct touch of industrial reality to the exhibition which was undoubtedly an important factor in attracting the crowds of interested visitors that filled the hall on every day of the show. It is not often that the public is given an opportunity to see how its wearing apparel is made, and in this case it responded most encouragingly. The majority of those who visited the show during the week were executives, representatives, employees, and others connected with every branch of the knitting trades.

Below is a general view of the exhibition hall and on the following pages are reproduced photographs of the exhibits of several manufacturers of dyestuffs, textile chemicals and machinery. While these comprise only a small part of the great number of booths making up the exhibition they will give the reader some conception of how attractive the displays appeared and how brilliant and impressive the entire Knitting Arts Exhibition was.

GENERAL VIEW OF KNITTING ARTS EXHIBITION

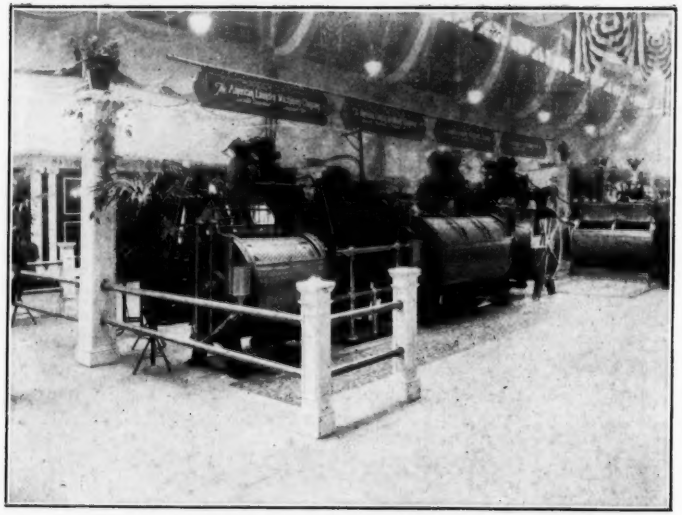
NATIONAL ANILINE & CHEMICAL COMPANY, INC.

JACQUES WOLF & CO.

E. I. DU PONT DE NEMOURS & CO.

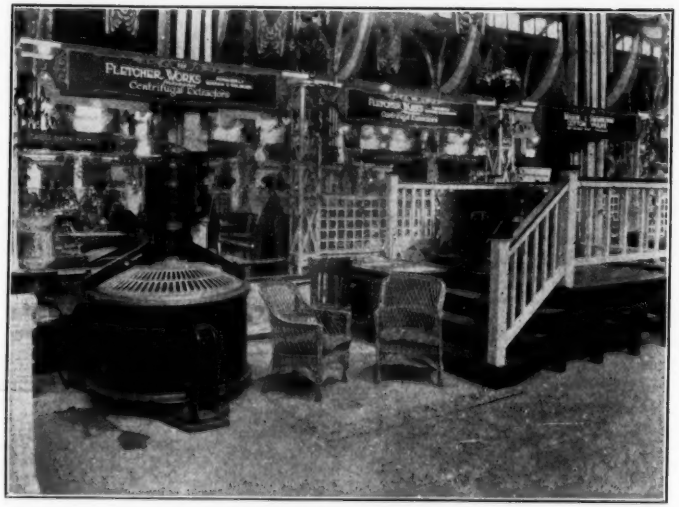
KALI MANUFACTURING COMPANY

Exhibitors at the Knitting Arts Exhibition

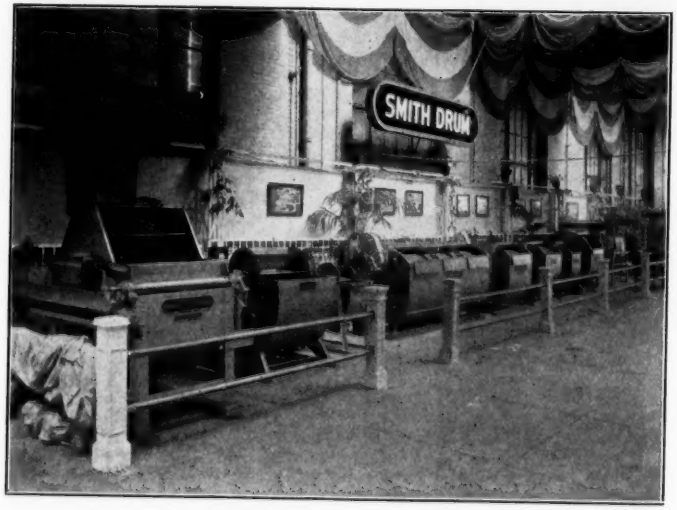


THE AMERICAN LAUNDRY MACHINERY COMPANY

THE INTERNATIONAL NICKEL COMPANY



FLETCHER WORKS, INC.



SMITH DRUM & CO.

Exhibitors at the Knitting Arts Exhibition

Practical Hints on the Production of Bright Colors on Textile Fabrics

Part XII

An Improved Plant for Topping—Its Operation and Advantages—A Special Form of Jigger—Construction and Operation—The Production of Extra Brilliant Effects

By RAFFAELE SANSONE

AN improved plant, where the circulation of the topping bath containing the basic coloring matter is two or more times the volume generally used, and where it is caused to circulate rapidly during the passage of the material, is constructed on the principle shown in Fig. 1.

This shows an ordinary form of jigger (V) with the usual batching or draw rollers of wood or other material, a wooden box strengthened with outer iron sides and rods, wooden internal binding rollers, etc. The batching rollers are supplied with friction-clutch coupling for forward and backward motion, and have brakes that act only when the roller is left to run freely. The whole machine is driven by a fast and loose pulley. The vat or trough of the jigger contains three lower and two upper binding rollers, the axles of which turn in bronze bearings.

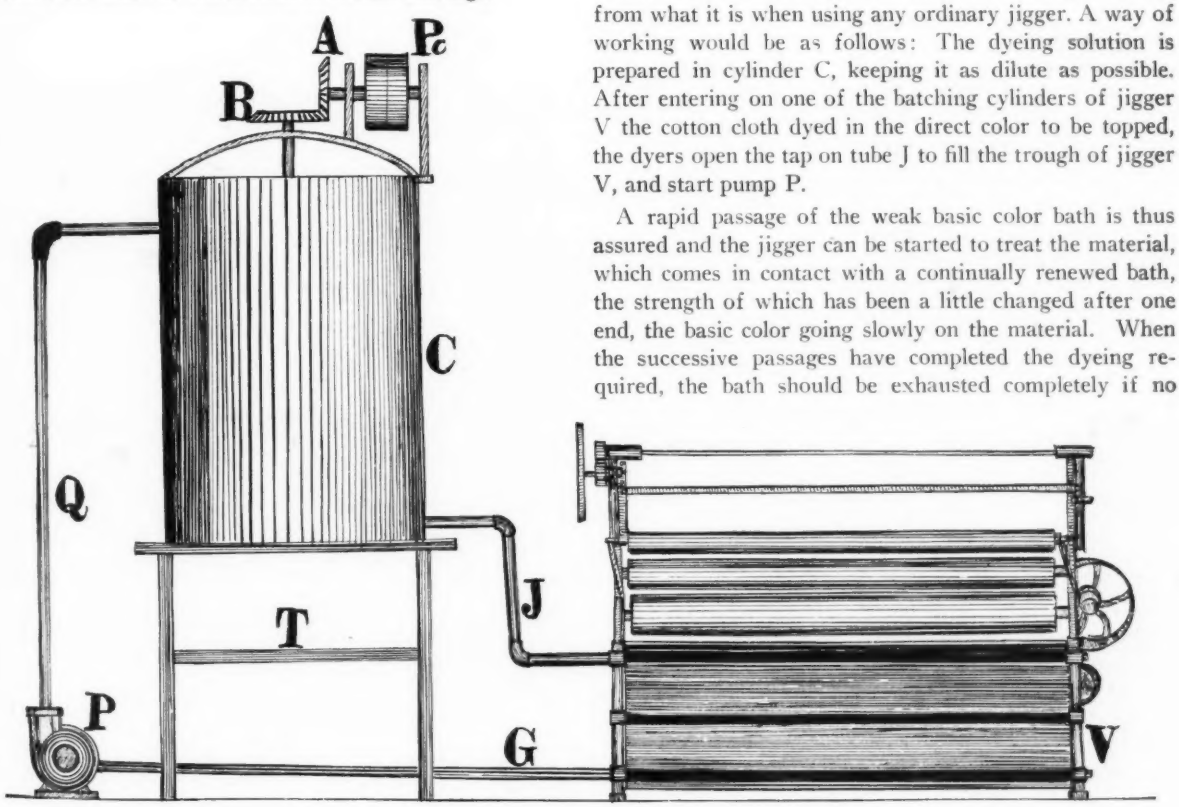


FIG. 1

At the lower portion of the jigger is fitted an iron tube (G) leading directly to pump P, which in its turn is connected by tube Q with a high iron copper-plated cylinder (C), serving for the preparation, mixing and circulation of the topping baths. These are entered in the upper portion of the jigger through a tap at the bottom of cylinder C and the tube J. The mixing operations in cylinder C are accomplished by an agitator, driven from above by the pinion wheels A and B and the fast and loose pulley Po. To allow the baths to enter easily in the vat of jigger V, cylinder C is placed at a certain height from the floor of the dyehouse on a low iron table, indicated in the sketch by T.

Operation of the Plant

Work on the above plant would not be very different from what it is when using any ordinary jigger. A way of working would be as follows: The dyeing solution is prepared in cylinder C, keeping it as dilute as possible. After entering on one of the batching cylinders of jigger V the cotton cloth dyed in the direct color to be topped, the dyers open the tap on tube J to fill the trough of jigger V, and start pump P.

A rapid passage of the weak basic color bath is thus assured and the jigger can be started to treat the material, which comes in contact with a continually renewed bath, the strength of which has been a little changed after one end, the basic color going slowly on the material. When the successive passages have completed the dyeing required, the bath should be exhausted completely if no

excess of dyestuff has been used. When the topping operations are finished, the dyers stop the entrance of the bath containing the basic color and run the pump until no further bath can be extracted from the trough of the jigger. Cold water is then circulated through the trough rapidly, giving the goods several ends before taking them out for the drying operations.

Advantages of the Plant

The above plant offers several advantages that can be indicated as follows:

1. The cotton cloth is treated with a weaker bath of the basic color and with much more liquid than is usually employed in the topping of cotton fabrics, simplifying the production of even shades.

2. The colorist can at any time take a sample of the dye bath for testing purposes and confirm the correct absorption by the material.

3. The cleaning of the plant can be accomplished very rapidly, at first with a little soda water which is made to circulate continuously and is used repeatedly, and then with plenty of clean running water.

4. The preparation of the topping baths is most rapid and sure, owing to the abundance of hot condensed water that can be introduced for the purpose in cylinder C and to the possibility of continually agitating the bath.

5. The dye bath is kept continually mixed, not only in the vat of jigger V but also in cylinder C, by running the agitation steadily; every part of the cotton cloth comes in contact with this, always in a homogeneous condition.

6. The working conditions on jigger V are the same as those on any other jigger of modern construction, and the slight difference in the special circulation arrangement can quickly be overcome.

7. Through the dilute condition of the dye bath and its rapid circulation it is possible to eliminate the use, in many cases, of acids or alum, lessening the cost of dyeing.

A Special Form of Jigger

There is no doubt that the danger of producing uneven shades and the necessity of continual attention on the part of the dyer, as is required when dyeing on ordinary jiggers, could be eliminated, even when using baths of a certain concentration, by adopting a more rapid movement of the batching rollers than usual and by reducing the time the fabric is in the basic color bath to the lowest possible limits. A plant with similar advantages, in addition to the advantage of changing the trough containing the bath whenever necessary, could be constructed on the principle shown in Fig. 2.

This shows a light iron framing (F) standing a little higher than the ordinary jiggers, the upper portion of which has a very small, shallow trough (U) having a tube (J) leading downward to a centrifugal pump (P) driven by a small electric motor. This pump is joined by tube L to the bottom portion of a lower and much larger vat (V) of trapezoidal shape, which serves in this instance only for the storage and distribution of the dye baths. Tube L can be disjoined from this vat whenever required by simply unscrewing a joint at its end, before which is a tap.

The base supporting vat V has small iron wheels and stands on a platform (L); through hydraulic pressure this can be raised whenever required or lowered to the bottom of a narrow canal (C). From this canal it can be run into the works for removal or renewal of the baths it contains. The upper portion of vat V contains an iron bar supporting a short shaft (O), hollow in the middle and supporting a heavy copper-plated iron agitator (A).

The upper portion of shaft O contains a large toothed wheel; when vat V is raised in position below frame F, this gears with a much smaller pinion wheel, turned from an upper mechanism in connection with the mechanism driving the whole plant. In the upper portion of shaft O enters a discharge tube at the bottom of the small trough U, through which all the bath contained in the trough flows down at a regulated speed.

The upper portion of frame F has the usual batching rollers driven through bevel wheels, the speed of which can be varied by a special arrangement, friction-clutch coupling for backward and forward movement, and brakes that function only when one of the batching rollers is left free during the unwinding. Besides this are the entrance arms for the placing of the end shafts of the beams containing the rolls of cloth.

Operation of the Plant

For working the above plant, the dyers enter a lot of several pieces on roller S in the position indicated by M, causing this to pass first through trough U, which has not

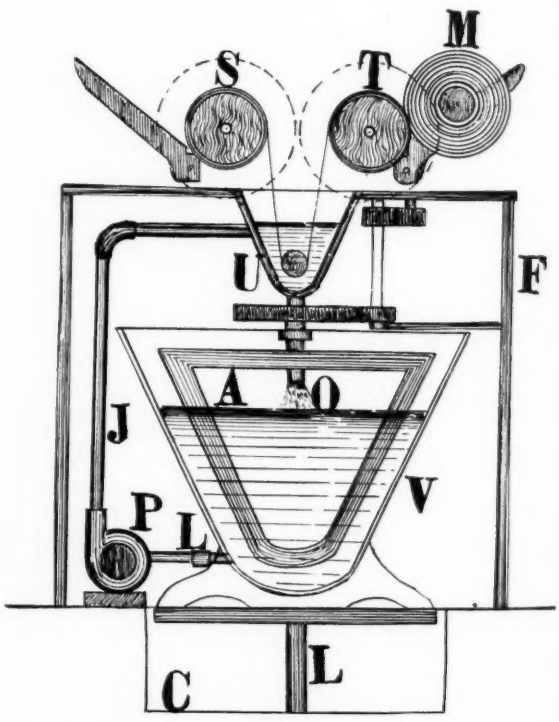


Fig. 2

yet been supplied with any dye bath, and fixing its end to the body of batching rollers S, with the assistance of a short piece of heavy cotton cloth nailed to the roller and its end border to another short slip of cotton cloth nailed to batching roller T. When this has been accomplished, vat V, which has been charged with the dye bath in another department, after closing the tap on its bottom before the joint is entered below frame F, is raised and fixed there to tube I.

In this way the upper toothed wheel of agitator A gears with the small pinion already indicated and takes up the end of the tube below trough U. The speed of the batching rollers is now regulated in accordance with the strength of the dye bath being employed; after this the whole plant is started.

The dye bath in vat V thus enters trough U, filling this up to a certain height and falling continuously down into vat V, a very rapid circulation being thus effected. The cloth, running through very rapidly, thus takes up only a portion of the bath of treatment, reaching the full intensity of coloring only after a certain number of passages backward and forward.

When the required shade is attained, the dyers simply stop pump P, the emptying of trough U then taking place very rapidly and automatically. After this they lower vat V and substitute it with a collection trough. Rinsing water is run in trough U and continued until the goods have been given several ends, the material being then rolled on the wooden shaft from which it was previously taken and carried to the drying department, being replaced by another roll of cloth to be treated after the plant has been rapidly washed.

Advantages of the Plant

The advantages of the above plant are several. Some of them can be indicated as follows:

1. All cleaning operations can be rapidly performed, one batch being treated after another with the least possible loss of time.

2. Several dye baths can be prepared in the vats at the disposal of the plant, being kept ready for use during the course of a day, and in some cases standing baths can be stored and reinforced before use; in this way all the dyestuff is used.

3. The cotton fabrics dyed with the direct colors come in contact with the bath of treatment very little, and the portion of this bath that is carried up with them continues its action on the batching rollers, although scarcely left the time to go very far, pressure rollers above the batching rollers sending down all excess of bath.

4. The exhaustion of the bath cannot only take place in trough U but is generally also conducted in vat V.

5. Much larger quantities of cotton can be treated on the machine than is possible on ordinary jiggers, so that the production can be considered as that of four or five times that of the other.

6. Through a special arrangement above vat V the agitator A can be removed with the greatest ease whenever desired, leaving the whole top of the vat quite free and greatly facilitating the preparation of the dye baths.

7. The exit of the dye baths takes place through the tap at the bottom of vat V, bringing them either to the waste water mains or to collection cisterns.

8. The space occupied by the plant is small, and labor, steam, motive power, etc., moderate.

9. Each vat with its water contents is pushed first below a closed vertical steam coil for heating to the required temperature, and then to the department or portion of the mill where the basic color is to be introduced, after which a rapid agitation with a wooden stick forms the solutions for the treatment of the goods.

10. As the bath is kept continually agitated in vat V during the dyeing operations, there is no danger of the formation of more concentrated layers, and a uniform bath all through is assured.

(To be continued)

THE GALLOPONT COLORS

A line of new dyestuffs under the name of "Gallopont Colors" has been developed and placed on the market by the Dyestuffs Department of E. I. du Pont de Nemours & Co. It is stated that these represent a most striking development in the class of basic dyes for the calico printing industry. They are related to basic dyes in shades and properties.

A salient advantage of the new type of colors lies in the fact that the preparation of the printing paste is much simpler than with basic dyestuffs as no mordant is needed.

The Gallopont colors are printed in the usual way but require no steaming. This is one of the main advantages of this new type. However, in addition, the resulting prints, due to the chemical nature of the dyes, stand the washing operation much better than the usual basic colors and do not stain white grounds. The new colors also produce much brighter shades and show better fastness especially to washing.

A beautifully bound and printed volume on these colors has just been issued by the Du Pont Company in a limited edition and is being distributed to those of their customers who are interested in cotton printing. The book is unusual from the point of view that its binding and the kind of paper used resemble more a handsome specimen of the printers' art than the ordinary commercial literature. Besides a description of the Gallopont colors and their use, together with data on their application, the book contains numbers of specimen prints, which are attractively and splendidly done and which show in a pertinent way the results obtained by the application of these new colors in calico printing.

Baker-Perkins Company announce that on April 13th their offices were removed to 250 Park Avenue, New York City.

FOREIGN DYES IMPORTED DURING MARCH

(*Continued from page 252*)

Name of Dye and Manufacturer	Quantity (pounds)
Poseidon Green VGGX—(B)	100
Radio Red G—(C)	100
*Sulphon Orange G—(By)	400
*Sulphon Yellow 5G—(By)	200
*Supramine Blue R—(By)	221
*Supramine Red 3B, 2G—(By)	534
*Wool Fast Blue BL—(By)	2,020
*Wool Fast Blue GL—(By)	1,358
*Xylene Milling Orange R Conc.—(S)	716

Vat Dyes

†Algol Blue 3RP Powder—By)	695
*Vat Brown G Paste—(By)	
Vat Brown G Paste—(B)	
†Helindone Brown IGG Paste—(M)	3,243
*Alizarine Indigo 7R Paste—(By)	399
Anthra Brilliant Green 5G Paste—(B)	
Anthra Brilliant Green 5G Paste Fine—(B)	1,553
Anthra Scarlet B Paste—(B)	
Anthra Scarlet B Powder (s. s.)—(B)	
Anthra Scarlet G Paste—(B)	
Anthra Scarlet G Powder (s. s.)—(B)	3,300
Anthra Wool Yellow GG Vat—(B)	10
Ciba Pink BG Paste—(I)	
Ciba Pink BG Powder (s. s.)—(I)	5,732
Cibanone Orange 3R Paste—(I)	220
Cibanone Red G Paste—(I)	220
*Duranol Orange G Paste—(BD)	100
Grelanon Red 2B Paste—(Gr.E)	224
Grelanon Scarlet 2G Paste—(Gr.E)	224
*Grelanon Violet BR Paste—(Gr.E)	560
Helindone Fast Scarlet B Paste—(M)	300
Helindone Printing Black RD Paste—(M)	5,500
*Hydron Brown G Paste—(C)	
Hydron Brown R Paste—(C)	
Hydron Brown R Powder (s. s.)—(C)	7,000
Hydron Green G Paste—(C)	100
*Hydron Pink FB Paste—(C)	
*Anthra Pink B Extra Paste—(B)	
Anthra Pink B Extra Powder (s. s.)—(B)	2,969
†Hydron Pink FF Paste—(C)	
Helindone Pink R Extra Paste—(M)	
†Anthra Pink R Extra Paste—(B)	
†Anthra Pink R Extra Powder (s. s.)—(B)	4,239
†Hydron Scarlet 2B Paste—(C)	
*Hydron Scarlet 2B Powder (s. s.)—(C)	1,542
*Hydron Sky Blue FK Paste—(C)	500
*Hydron Violet B Powder (s. s.)—(C)	75
Hydron Yellow GG Paste—(C)	400
†Hydron Yellow NF Paste—(C)	
†Vat Yellow NF Paste—(C)	4,134
Hydron Yellow Brown G Paste—(C)	100
Hydron Yellow Olive GG Paste—(C)	100
†Cibanone Blue G Powder (s. s.)—(I)	
†Vat Blue BCS Powder (s. s.)—(B)	5,255
Vat Blue Green B Dbl. Pst. Fine (s. s.)—(B)	600
Vat Blue RRZ—(B)	200
†Vat Brilliant Blue R Paste Fine—(B)	650
Vat Green G Powder (s. s.)—(B)	
Vat Green GG Powder (s. s.)—(B)	
Helindone Green IGG Dbl. Pst. (s. s.)—(M)	1,400
Helindone Pink IB Dbl. Pst. (s. s.)—(M)	882
Vat Black 2B Paste—(Gr.E)	425

Mordant and Chrome Dyes

*Acid Alizarine Gray G—(M)	2,000
*Alizarine Fast Blue BHG—(By)	110
*Alizarine Fast Gray 2BL Powder—(By)	717
Alizarine Fast Light Brown GL—(By)	100
Alizarine Fast Light Gray BS Conc.—(S)	1,212
Alizarine Yellow GD—(S)	200
*Anthracene Bordeaux R Powder—(B)	200
Brilliant Chrome Blue S—(DH)	220
*Brilliant Chrome Violet 3R—(DH)	110
Chromanol Black RVI—(DH)	110
Chromazurine DN—(DH)	
*Chromazurine G—(DH)	1,210
Chrome Fast Phosphine R—(DH)	110
Chrome Printing Red Y—(DH)	441
Chromocitromine 3R—(DH)	220
Chromogene Violet B—(M)	
Pilatus Chrome Brilliant Violet B—(B)	1,000
Chromorhodine BN—(DH)	
*Chromorhodine BR—(DH)	1,543
*Chromovesuvine RA—(DH)	110
*Chromoxane Brilliant Violet SB—(By)	450
Chromoxane Pure Blue B—(By)	750
*Eriochromal Gray 5G—(G)	220
Eriochrome Red G—(G)	551
*Metachrome Blue Black 2BX—(A)	2,200
*Metachrome Olive Brown G—(Bro.)	500
Metachrome Orange R—(A)	100

Direct Dyes

*Artificial Silk Black G—(By)	100
*Azonine Direct Blue B Paste—(C)	600
Azonine Direct Red G Paste—(C)	1,000
Azonine Direct Yellow RR Paste—(C)	600
*Benzo Fast Brown GL—(By)	99
*Benzo Fast Brown 3GL—(By)9	940
Benzo Fast Brown RL—(By)	297
*Benzo Fast Heliotrope BL—(By)	440
*Benzo Fast Heliotrope 4BL—(By)	100
*Benzo Fast Red 6BL—(By)	100
Benzo Red 12B—(By)	440
*Benzo Rhoduline Red 3B—(By)	100
*Brilliant Benzo Fast Yellow GL—(By)	200
*Brilliant Benzo Violet B—(By)	442
*Brilliant Benzo Violet 2BH—(By)	100
*Brilliant Benzo Violet 2R—(By)	1,000
Brilliant Cotton Blue 8B—(K)	100
Brilliant Fast Blue 3BX—(By)	100

Name of Dye and Manufacturer	Quantity (pounds)
Brilliant Pure Yellow 6G Extra—(By)	300
*Brilliant Sky Blue 8G Extra—(By)	3,087
*Brilliant Sky Blue 2RM—(By)	397
Celatine Blue—(Q)	500
†Chlorantine Fast Blue 2GL—(I)	6,614
Chlorantine Fast Brown BRL—(I)	661
Chlorantine Fast Brown 3GL—(I)	2,204
*Chlorantine Fast Gray B—(I)	441
*Chlorantine Fast Violet 5BL—(I)	1,102
*Chlorantine Fast Violet RL—(I)	1,102
Chlorantine Fast Violet 2RL—(I)	1,102
Chlorantine Fast Yellow RL—(I)	551
†Developing Blue B—(Gr.E)	100
Developing Indigo Blue R—(A)	200
*Diamine Azo Bordeaux BL—(C)	463
*Diamine Azo Brown G—(C)	220
Diamine Azo Brown 3G—(C)	456
*Diamine Azo Fast Red 6B—(C)	50
Diamine Azo Fast Violet R—(C)	331
Diamine Azo Yellow 2G—(C)	1,091
*Diamine Brilliant Scarlet S—(C) (Non-competitive for part of total quantity imported through Providence. No designation on competitive or non-competitive on balance.)	2,000
†Diamine Fast Blue FFB—(C)	50
†Diamine Fast Orange ER—(C)	500
Diamine Fast Violet FFRN—(C)	500
Diamine Steel Blue L—(C)	50
Diaminogene Blue GG—(C)	1,224
Diazamine Blue 4R Conc.—(S)	500
*Diazo Brilliant Scarlet 2BL Extra—(By)	971
Diazo Brilliant Scarlet 6B Extra—(By)	429
*Diazo Brilliant Scarlet S8B—(By)	99
*Diazo Brown 3G Paste—(By)	440
*Diazo Brown 3RB—(By)	1,197
Diazo Fast Blue 6GW—(I)	331
*Diazo Fast Violet BL—(By)	639
*Diazo Fast Yellow G—(By)	100
*Diazo Indigo Blue 4GL—(By)	894
*Diazo Rubine B—(By)	200
*Diazo Sky Blue 3G—(By)	400
*Diphenyl Catechine R Supra—(G)	1,102
Direct Cutch Brown N—(I)	1,102
Direct Fast Red 3B—(By)	220
Fast Cotton Brown 4RL—(A)	200
Fast Cotton Gray VL—(A)	500
Formal Fast Black G Conc.—(G)	51
Formal Fast Black R Conc.—(G)	112
†Minaxo (Oxamine) Black BBNX—(B)	300
Naphthamine Light Brown 2G—(K)	300
Naphthamine Light Orange L—(K)	300
Naphthamine Light Violet 2B—(K)	300
*Rosanthrene Orange R—(I)	1,102
Rapid Fast Orange RG Paste—(Gr.E)	200
SRA Blue IV—(Q)	270
*SRA Red I—(Q)	270

Name of Dye and Manufacturer	Quantity (pounds)
Basic Dyes	
*Brilliant Acridine Orange 3R—(DH)	441
*Rhodamine Sky Blue 3G—(By)	110
Sulphur Dyes	
*Cross-Dye Green B—(BD)	8,960
*Katigene Indigo CLGG Extra—(By)	503
Pyrogene Brown G—(I)	441
Pyrogene Brilliant Blue 6B—(I)	110
Pyrogene Green GK—(I)	1,102
*Sulphide Violet V—(M)	100
Thional Brilliant Blue 6BS Conc.—(S)	3,046
Color Lake Dyes	
Brilliant Carminogene 3B Powder—(M)	20
Hansa Red 2G Paste—(M)	10
*Helio Bordeaux BL Powder—(By)	582
*Helio Fast Violet AL—(By)	100
Lake Bordeaux BL Powder—(Q)	331
*Paper Fast Bordeaux B—(By)	200
†Permanent Red F6R Extra—(Gr.E)	5
Stone (Lithol) Fast Orange R Powder—(B)	250
Stone (Lithol) Fast Yellow 5G Paste—(B)	200
*Stone (Lithol) Fast Yellow GN Lumps—(B)	1,000
Unclassified Dyes	
Naphthol Ciba R—(I)	44
*Soldon Jade Green—(BD)	1
Zapon Blue G Powder—(B)	3
*All Other Dyes—(Q)	1
Color Lakes of Coal-Tar Origin	
Alizarine Carmine	11
Azure Blue 89N Extra, 1137K	941
Brilliant Green BB Powder, GR Powder	1,760
Brilliant Lake PD	100
Fast Yellow Lake Powder	110
Madder Lake 75	400
Madder Lake 71 Extra Powder	600
Seigle Red No. 1 Powder	110
Violet 16S Powder	440
Viridine Green Powder	200
Viridine Lake H Powder	750

The Dye Products & Chemical Company, Inc., has recently put on the market two new products for the textile trade: Dyelene Chrome Mordant T, used as a reducing agent to replace half refined tartar lactoline, oxalic acid, etc. The advantages of using Dyelene Chrome Mordant T are the saving in cost of material as well as giving better dyeing results. Dyelene meta-chrome mordant is used in the dyeing of meta-chrome or chromate colors.

Technical Notes from Foreign Sources

Influence of Light on Colors

In the German journal, Wollen und Leinen Industrie, 1924, page 352, there is an article which deals with the nature of the processes in which coloring matters are involved during the course of their decomposition by light. Apparently a chemical reaction takes place in which the oxygen in air plays an important role. If this contention is true, then it must follow that these chemical phenomena will not take place in the absence of air or of oxygen. Apparently the principal role is that played by the formation of peroxide with the oxygen and the hydroxyl ions of water, as it has been found that the moisture in the air also has an important bearing on the light sensitiveness of the coloring matter.

The peroxide of the coloring matter is formed particularly when it is subjected to the action of rays whose colors are complementary to its own color. These peroxides or hydroxides are stable at first, so that a change in the color tone is not noticed at the outset. However, under the action of the violet or ultra-violet rays a decomposition occurs wherein the active oxygen that is contained in these compounds attack that part of the coloring matter which is still unchanged.

The resistance of a coloring matter to light depends in the highest degree on the nature of the fiber on which it is dyed. Hence, in making comparative tests of the fastness of a dyestuff to light the following conditions must be maintained constant: the moisture content of the dyed fiber, the behavior of the fiber itself to the oxygen of the air, the source of light which should be particularly rich in violet and ultraviolet rays, the purity and the uniform condition of the air.

Para Red Piece Dyeing

Although Para Red is a comparatively simple dyestuff, certain difficulties which surround its formation, particularly on piece goods, which must be overcome in order to obtain good results. The process is carried out with two solutions. The first solution is the familiar one of sodium beta-naphthol and the goods are impregnated with this solution in the cold. The concentration of this solution depends on the character of the piece goods. When a piece of goods is about one hundred meters long and eighty centimeters wide and weighs no more than 10 to 20 kilograms, then it requires from 1.5 to 2.5 kilograms of beta-naphthol and a similar amount of a 40 deg. Be. solution of sodium hydroxide. The two chemicals are mixed together and then are further mixed with 20 to 40 liters of hot water. Finally from 5 to 7 kilograms of Turkey red oil are added, the oil being of 60 per cent concentration and the entire bath is brought up to 100 liters. The impregnation takes place at 30 to 40 deg. Cent. A Foulard machine is used for this purpose and also for squeezing out the excess liquor until the cloth does not contain more than 100 to 120 per cent in weight of the beta-naphthol mixture.

Then the fabric is dried in warm air which is blown through the drier, while the moisture-saturated air is removed by another fan. It is essential that the drying temperature does not go above 50 to 70 deg. Cent., as otherwise the beta-naphthol is partially sublimed. The naphtholated goods must be treated at once with the coupling bath as the action of the air is such that brownish spots are produced which afterward spoil the red color developed on the goods.

The coupling is accomplished in the usual manner with a solution of diazotized paranitraniline or a solution of the diazonium salt of paranitraniline or then again of the nitrosamine of paranitraniline. The preparation of these solutions requires considerable care. The solution of the paranitraniline in acetic acid is at the very outset an operation which is surrounded with difficulties, as the product obtained possesses the tendency of precipitating again when ice water is poured into the solution. When this occurs it is very difficult to bring the paranitraniline back into solution again. Care is also required in mixing the filtered solution of paranitraniline with the acidified solution of sodium nitrite. In the original article on this subject which is published in the Textilchemiker und Colorist, 1924, pages 29-32, No. 5, exact details are given on conducting this process to obtain the best possible results.

Removal of Color from Fabrics

The article in the Zeit. ges. Tex. Ind., 1924, pages 320 and 343, is concerned with the use of hydrosulphites for removing the color from fabrics. Hydrosulphite of sodium is a chemical which is used largely in the indigo dyeing process. Then again it is used frequently in the form of its formaldehyde derivative as a discharge agent in printing of textile fabrics. When this chemical is employed in the decolorizing process, it is used in a formic acid or sulphuric acid solution. This solution contains from 0.1 to 0.5 per cent of this formaldehyde compound. Then again a neutral or alkaline solution of hydrosulphite alone can be used for this purpose.

The goods are placed into this solution after its temperature has been raised to 50 deg. Cent. and the boiling lasts for 20 to 30 minutes. Only a very slight weakening action on the fibers is entailed by this treatment. In order to remove the color from cotton, jute and artificial silk, it is customary to use the pure hydrosulphite solution under most conditions. The formaldehyde preparations are brought out on the market under various trade names and in these forms are lasting.

There is, however, an entire series of coloring matters which are not affected by the hydrosulphite solution. These are the chrome dyestuffs, the vat dyestuffs, Diamine

Yellow, Rhodamine on silk and wool, Eosine, Phosphine and Auramine and many Methylene Blue marks. Zinc chloride was most used for removing the coloring matter from the fibers, but its use has decreased since it was established that it had a deleterious action on the fibers themselves. The sulphate process is similarly disadvantageous.

Good results are often obtained by the simple use of alkalies. For example, the ordinary acid colors, dyed on wool and silk, may be easily removed by steeping the goods in a warm alkaline bath, the temperature being in the neighborhood of 30 to 35 deg. Cent. Only sal ammoniac and borax can be used with safety on woolen goods. Glauber salt is also suitable for this purpose. In the case of silk common soap may be employed, particularly in conjunction with water-soluble oils. The action of this mixture is increased by the addition of a little methyl alcohol.

In the decoloring process metal and enamelled ware should be used as far as possible, particularly when treating woolen and silken fabrics. Of course, metallic apparatus cannot be thought of in digesting vegetable fibers with neutral salts or alkalies. Hydrosulphite is also useful in removing ink spots, wine stains and all sorts of colored spots.

Treatment of Mixed Fabrics Containing Cotton

Highly translucent effects, with a silky luster, or a stiff finish are produced on cotton materials in hank or piece by subjecting the material to the action of sodium hydroxide and carbon disulphide at a temperature which does not exceed zero deg. Cent. The cotton material may first be treated with carbon disulphide or with caustic soda, or with both substances together, but it is essential that a low temperature, from minus 25 to 0 deg. Cent., is used when the carbon disulphide is acting or after it has acted and while it is still present upon the cotton in the presence of alkali.

If desirable the carbon disulphide may be diluted with an organic solvent, such as benzene, chloroform, or carbon tetrachloride. Pattern effects may be produced by the use of reserve printing pastes which contain acids or albumin. It is essential that the material is stretched at some part of the process if a silky luster is to be obtained.

For example, unbleached or bleached cotton fabric is padded with 15 to 18 per cent of caustic soda, and after from one to three days is treated with the vapor of carbon disulphide or liquid carbon disulphide itself or diluted ten times its volume with benzene for a few seconds up to ten minutes. After this treatment the cloth is immersed in a 6 to 15 per cent solution of sodium hydroxide for a period lasting from ten minutes to one hour. This operation is carried out at a temperature which varies from zero deg. Cent. to minus 12 deg. Cent. The fabric is then washed, soured, and washed again. A silky luster or stiff finish is thereby obtained according to the duration of the treatment and the tension that is used.

This process is patented in British Patent No. 216,477.

Dyeing of Knitted Goods

Knitted goods are dyed in bright or dark colored shades according to the use to which they are going to be put. One essential point in the dyeing process to which particular attention must be paid, if uniform results are to be obtained, is the introduction of the steam in as regular a manner as possible. To this end the steam pipe must extend throughout the entire length of the dye vat, and it should be extended across the entire bottom of the tank so that steam is simultaneously introduced at all points. When the heating of the dye bath is not absolutely regular, then streaks are formed on the dyed goods.

Before the knitted goods are dyed, and just after they are taken off the knitting machines, it is advisable to give them a single boil with hot water to which from 3 to 5 per cent of soda ash has been added. This is for the purpose of removing all the oily and greasy materials that may be mixed with the fibers. In case half woolen goods are being treated, the soda solution is replaced by a solution of textile soap which is kept in a lukewarm condition.

The straight cotton knitted goods are washed, after treatment with alkali, directly in the vat where the latter operation was carried out. Fresh water is simply added to the vat and a constant stream is permitted to flow through the apparatus until the goods are well washed. When necessary the goods may be bleached with a solution of hypochlorite of ½ to 1 deg. Tw. concentration. Electrolytic bleaching has been found to be more advisable. Peroxide liquors are also used for bleaching woolen and silken knit goods. The sulphur bleach is also often applied to woolen goods.

The direct colors are mostly used for dyeing these knit materials. The operation is carried out in the usual manner. The addition of a water soluble oil is recommended, as very good results are obtained with it. A better penetration of the coloring matter is secured when such an oil is employed. Only about 1 per cent of the soluble oil, figured on the weight of the goods, need be used. Dark colors are produced on cotton and woolen knit goods by carrying out the dyeing operation in a dye bath that is as short as possible. Glauber salt is added to the dye liquor. The fabric is boiled for 20 to 30 minutes, then additional coloring matter is added to the bath as necessary and the cooking is continued. If the woolen part of the fabric is not colored satisfactorily in this manner, it is customary to add a small amount of the proper wool color. Then as the dye liquor cools off, this dyestuff also colors the cotton part of the fabric, and by careful observation of the dyeing process it is possible to obtain a uniform coloring over the entire fabric. (Deutsche Faerber Zeitung, 1925, 84.)

The Du Pont Fibersilk Company, of Nashville, Tenn., will double the capacity of its new plant immediately at a cost of $2,750,000, it is understood.

DYESTUFF TABLES

(*Continued from page 265*)

ON UNIONS: Cotton-wool unions: The wool is dyed very slightly. Cotton-silk unions: The silk is left white.

ON OTHER MATERIALS: Wool: No interest. Silk: No interest. Paper: Backwater clean.

PRINTING: Not suitable.

DISCHARGING: Discharges white with hydrosulphite.

COMPETING PRODUCTS: Made in the United States by American Aniline Products, Inc., under the name of Amanil Brilliant Blue 6B; Newport Chemical Works, under the names of Direct Sky Blue 6B Conc. and Direct Sky Blue FF Conc.; National Aniline & Chemical Company, under the name of Niagara Sky Blue 6B; Palatine Aniline & Chemical Corporation, under the name of Pacco Direct Sky Blue FF (Selling Agents, F. E. Atteaux); E. I. du Pont de Nemours & Co., under the names of Pontamine Sky Blue 6B and Pontamine Sky Blue 6BX.

DIAMINE RED 10B

(Schultz No. 405)

COMPOSITION: Disazo.

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: With salt and soda.

SHADE: Carmine red.

SHADE BY GASLIGHT: Yellower.

SOLUBILITY: Good.

LEVEL: Dyes level.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Very sensitive; turns blue.
Alkali: Fast.
Chlorine: Moderate.
Light: Changes shade on few days' exposure.
Perspiration: Fast.
Rubbing: Fast.
Steaming: Does not stand steaming.
Washing: Moderate; bleeds off.
Water: Bleeds in water at 104 deg. Fahr.

OTHER PROPERTIES: Liable to show yellow streaks in dyeing. Suitable for pad dyeing and mercerizing.

DYED BY OTHER METHODS: Dyes wool from a neutral bath.

ON OTHER MATERIALS: Useful for wool and silk. In dyeing cotton-wool unions the wool is dyed deeper than the cotton. Suitable for cotton-silk unions.

DISCHARGING: Discharges with tin crystals and also with zinc dust.

COMPETING PRODUCTS: Made in the United States by American Aniline Products, Inc., under name of Amanil Purpurine 10B; Newport Chemical Works, under name of Benzo Purpurine 10B; National Aniline & Chemical Company, under name of Erie Cardinal 7B; Calco Chemical Company, under name of Direct Red 10B; Palatine Aniline & Chemical Corporation (Selling Agents, F. E. Atteaux & Co.), under name of Pacco Red 10B; E. I. du Pont de Nemours & Co., under name of Purpurine 10B.

DIRECT YELLOW G CONC.

(Schultz No. 10)

Direct Yellow G Conc. is now being manufactured by John Campbell & Co. under the name of Amidine Yellow NFA.

A NEW INDUSTRIAL SERVICE

A novel service for industrial and financial interests has been inaugurated by William F. Collins, who has opened an office at 31 Nassau Street, New York City, as a "consulting economist." Mr. Collins proposes to make individual investigations and supply special reports to his clients on industrial and financial matters in which they may be interested, with particular reference to foreign business conditions.

Mr. Collins was formerly secretary of the American Bankers Association, was later secretary to the proposed Foreign Trade Financing Corporation, and since has been, until April 1st, an officer of the Seaboard National Bank. His experience and connections qualify him in an exceptional manner to serve industrialists desiring reliable information on foreign marketing conditions.

CHEMIST OFFERS SERVICES

B. Sc. Tech. wishes to serve as chemist or assistant to calico printers, cotton dyers, or finishers, with salary or *gratuitously*. Over a year's practical experience. Apply Box 294.

POSITION WANTED

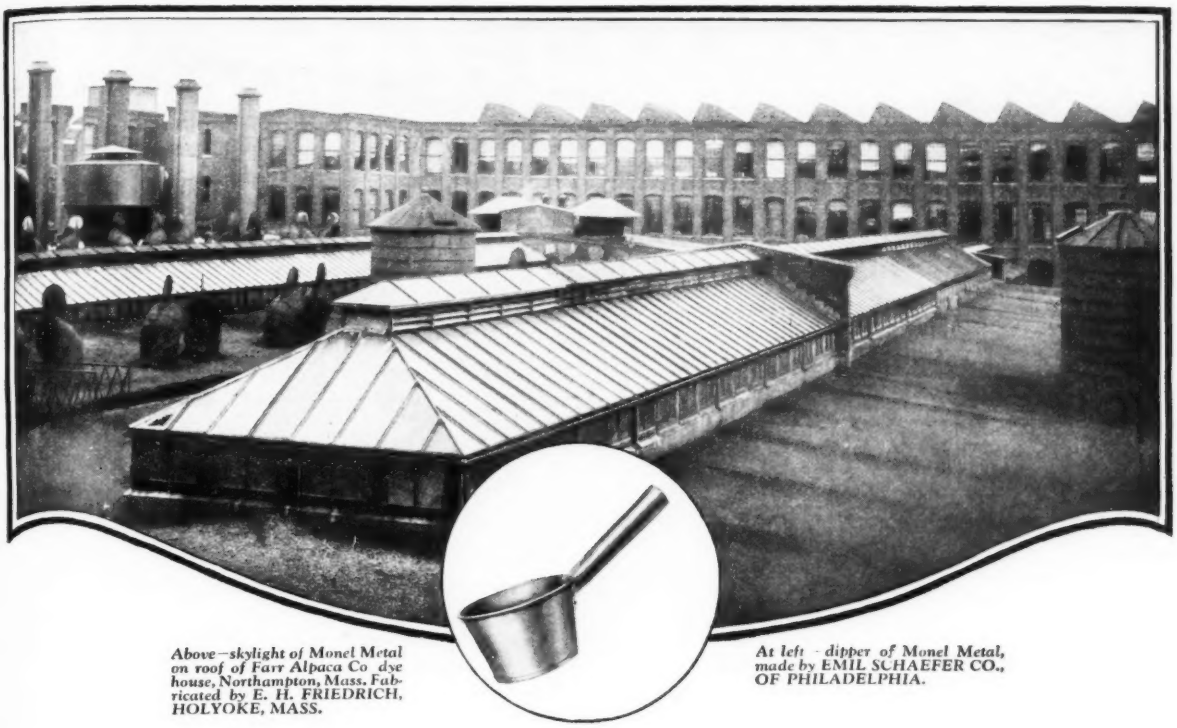
Position wanted as second hand in cotton piece goods dyeing by a young Greek man, thirty years of age, a graduate of the Evening Lowell Textile School. Experienced on jigs, pads and kettles. Address Box 295, American Dyestuff Reporter.

TEXTILE CHEMIST

WANTED—Young textile chemist. Experienced in testing and service laboratory of dyestuff house and in practical application of colors necessary. Able and willing to assume responsibility and be possessed of initiative and imagination. State salary required. Address Box 296, American Dyestuff Reporter.

VAT COLOR CHEMIST

German chemist, specialist in vat colors, desires leading position in aniline color factory. Address Box 297, American Dyestuff Reporter.



Above—skylight of Monel Metal on roof of Farr Alpaca Co dye house, Northampton, Mass. Fabricated by E. H. FRIEDRICH, HOLYOKE, MASS.

At left - dipper of Monel Metal, made by EMIL SCHAEFER CO., OF PHILADELPHIA.

For the roof of the dye house and the dipper in the tub *for economy's sake, specify Monel Metal*

ONLY an expert can decide which metal is most economical for each job that must be done—a flashing on the roof, or a ladle in the dye-room. Banish all uncertainty by calling up your sheet metal worker and asking him about Monel Metal.

Monel Metal is a silvery-looking metal with just the properties needed for dye house jobs. It is immune to rust and resists corrosion. Its steel-like strength combined with its other unique properties gives it maximum length of life.

It is so easily cleaned, it is particularly well suited for use where appearance is important—it is used extensively where product contamination must be prevented.

For the next job—whether it is a roof or a new lining for a dye-tub, consult your sheet metal worker and then specify Monel Metal. For technical advice, call upon our engineers—their advice is always available.

Write today and tell us how we can help you.

ASK FOR "LIST B" OF MONEL METAL & NICKEL LITERATURE

THE INTERNATIONAL NICKEL COMPANY
67 WALL STREET NEW YORK CITY

Monel Metal is a technically controlled Nickel-Copper alloy of high nickel content. It is mined, smelted, refined, rolled and marketed solely by The International Nickel Company. The name "Monel Metal" is a registered trade-mark.

INCo Monel metal

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Every delivery of our Colors is guaranteed equal to standard. No shipment leaves our warehouses without closest scrutiny.

Our experts in the dyeing of leather and textiles are at the call of Manufacturers and Finishers. No charge is made for their time and experience.

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We are equipped to render a service unexcelled by any American distributor of dyestuffs by giving counsel and aid to accomplish best results in the dyehouse.

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We announce the latest addition
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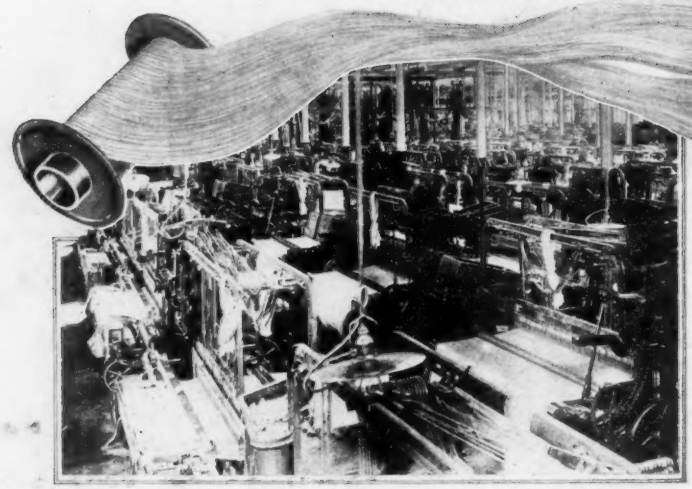

The Influence of
"AKCO" Warp Size
is Apparent in Loom Production

The use of "AKCO" ***Warp Size*** for sizing cotton warps, gives to the yarns the smooth, highly flexible and elastic qualities which lead unfailingly to maximum loom output.

The remarkable penetrative properties of "AKCO" ***Warp Size*** impart a degree of strength to the yarns, affording a highly desirable working quality and a positive reduction of loom stoppage.

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